# THE IMPACT OF MANAGEMENT ACCOUNTING CONTROL CAPABILITY ON THE FINANCIAL PERFORMANCE OF NEW ENERGY EQUIPMENT MANUFACTURING ENTERPRISES: A CASE STUDY OF GOLDWIND

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# ABSTRACT

New energy equipment manufacturers operate with long project cycles, complex supply chains, and uneven cash conversion, so market growth does not automatically produce stronger financial performance. The objectives of this study were to examine how three management accounting control capability (MACC) dimensions—information integration and decision use, resource allocation and cost control, and working-capital and risk control—are associated with Goldwind's financial performance and to develop recommendations. Document analysis was used as the research method, while the literature review served as the research process for identifying, comparing, and synthesizing relevant theoretical and empirical sources. Forty non-company sources published from 1980 to 2025 were reviewed and synthesized based on the Resource-Based View, Management Control Systems Theory, and Contingency Theory. An analytical matrix organized around the three MACC dimensions served as the research instrument for classifying and comparing the document evidence. Goldwind's annual report, financial statements, sustainability report, and official announcements were analyzed using the matrix. Evidence for each dimension was matched with management actions and operating or financial indicators, with comparisons focused on 2024 and 2025. The first dimension was associated with operating-efficiency improvements, but these gains did not fully translate into higher service profitability. The second dimension showed the clearest financial evidence because revenue grew faster than cost and margins improved in WTG and international business. The third dimension showed better financing and aging indicators, but higher impairment, tighter short-term maturity concentration, and lower cash limited improvement. The study concludes that MACC should be assessed through linked operating, profitability, cash, and financing outcomes rather than one headline indicator in practice. Recommendations focus on connecting digital decisions with profitability, reviewing product and market allocation through revenue-

cost-margin outcomes, and integrating receivable, impairment, financing, and maturity management.

**Keywords:** management accounting control capability, financial performance, information integration, resource allocation, working-capital control, Goldwind

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LIANG XIN

August 31, 2026

# DECLARATION

I, LIANG XIN, hereby declare that this Independent Study entitled "The Impact of Management Accounting Control Capability on the Financial Performance of New Energy Equipment Manufacturing Enterprises: A Case Study of Goldwind" is an original work completed under academic supervision. All ideas, data, and wording drawn from other sources are acknowledged, and this work has not been submitted, in whole or in part, to any other university or institution for a degree or qualification.

Liang Xin

LIANG XIN

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# Chapter 1 Introduction

## 1.1 Background of the Study

New energy equipment manufacturing plays an important role in the transition to a lower-carbon economy, but market growth does not automatically lead to stronger financial performance. Wind-turbine manufacturers manage large projects, long production and acceptance cycles, substantial research and development expenditure, dispersed supply chains, and complex payment milestones. Revenue can grow while margins and cash conversion improve more slowly. This makes timely management information and effective control especially important before operating problems become financial losses.

Financial performance in this setting cannot be judged by net profit alone. Profitability shows whether price, cost, and business mix create value; operating efficiency reflects how well resources and working capital are used; cash-flow quality shows whether earnings are supported by cash; and financial resilience reflects the firm's ability to absorb volatility. These dimensions need to be considered together because growth can coexist with pressure on receivables, inventory, liquidity, or future investment (Kaplan & Norton, 1992; Ittner & Larcker, 2001).

Management accounting control capability (MACC) is important because it connects information, decisions, resource use, and risk responses. It refers to the organizational ability to combine financial and operating information, use it in planning and managerial decisions, coordinate resources, monitor deviations and risks, and turn feedback into corrective action. The capability depends on data, people, responsibilities, decision routines, and follow-up rather than on a budget, dashboard, software platform, or control rule alone (Malmi & Brown, 2008; Grabner & Moers, 2013; Bedford, 2020).

Information integration and decision use is the first important dimension. New energy equipment manufacturing links procurement, production, project delivery, service, and customer payment, so managers need reliable financial and operating information across these activities. Information becomes useful when it supports a specific decision and is reviewed after implementation. Better integration can improve operating visibility and help managers identify cost, efficiency, and service issues earlier (Henri, 2006; Möller et al., 2020; Fähndrich, 2023; Bedford et al., 2025).

The resource allocation and cost control dimension is equally important because manufacturers must decide how to commit capital, technology, engineering capacity, research and development spending, and market effort across products and regions. Strong revenue growth does not necessarily improve financial performance if costs rise at the same pace or resources are committed to weak-return activities. Effective allocation and cost review therefore help determine whether growth in products and international markets is converted into stronger profit and margins (Otley, 1999; Anthony & Govindarajan, 2007; Bedford et al., 2016).

The working-capital and risk control dimension is important because long project and settlement cycles can place pressure on cash even when revenue and profit are improving. Receivables, loss allowances, impairment, financing costs, debt maturity, and available cash need to be monitored together. Effective control can reduce exposure and financing pressure, while weak cash conversion or concentrated short-term obligations can limit the sustainability of financial improvement (Deloof, 2003; Boisjoly et al., 2020; Kiymaz et al., 2024).

Goldwind provided a suitable setting for examining these three dimensions because its activities combined wind-turbine manufacturing, services, project-related operations, and international business. The company therefore faced information, resource-allocation, cost, working-capital, and risk-management issues within the same operating context (Goldwind Science & Technology Co., Ltd., 2026b). This study examined how the three MACC dimensions were associated with Goldwind's financial performance, while the detailed theoretical explanations and evaluation indicators were developed in the following chapters.

## 1.2 Questions of the Study

1. How is the information integration and decision use dimension associated with Goldwind's financial performance?
2. How is the resource allocation and cost control dimension associated with Goldwind's financial performance?
3. How is the working-capital and risk control dimension associated with Goldwind's financial performance?

## 1.3 Objectives of the Study

1. To assess the association between the information integration and decision use dimension and Goldwind's financial performance, and to provide recommendations for improving information-supported decisions.
2. To assess the association between the resource allocation and cost control dimension and Goldwind's financial performance, and to provide recommendations for improving resource and cost management.
3. To assess the association between the working-capital and risk control dimension and Goldwind's financial performance, and to provide recommendations for strengthening cash-flow quality and financial resilience.

## 1.4 Scope of the Study

The conceptual scope covered three MACC dimensions and financial performance. The first dimension was assessed through operating efficiency and service profitability. The second was assessed through WTG and international revenue, cost, gross profit, and margin. The third was assessed through receivable

aging, loss allowances, impairment, borrowings, net finance expense, gearing, and short-term debt.

The literature scope contained 40 non-company sources published from 1980 to 2025. These sources included foundational theory, empirical studies, literature-review guidance, and authoritative institutional materials. They were used to define the concepts, explain the three mechanisms, compare findings, and identify the conditions under which an association may appear stronger, weaker, or more conditional.

The company scope was Goldwind Science & Technology Co., Ltd. at the consolidated-group level. Company information came from Goldwind's official profile, 2025 Annual Report and audited year-end statements, Sustainability Report, and official impairment announcements. The financial series covered 2021–2025, while the detailed dimension-to-performance matching compared 2024 and 2025.

## 1.5 Significance of the Study

Information integration can improve managerial decisions, resource allocation turns those decisions into product and market commitments, and working-capital and risk control manages the credit, impairment, financing, and maturity pressures that may weaken the result. This connection helps explain why growth, profitability, exposure, and liquidity do not always move in the same direction.

For Goldwind and similar manufacturers, the study linked digital information with service results, product and market commitments with profitability, and credit and financing responses with liquidity. This made the strengths, limits, and trade-offs associated with each dimension easier to identify.

For investors, creditors, suppliers, employees, regulators, and future researchers, the study offered a clearer way to interpret performance beyond a single profit figure. It also showed why a formal control or a favorable ratio alone may not reflect the full financial position. The same framework can be applied to similar project-based manufacturing enterprises.

## 1.6 Definition of Key Terms

Management accounting control capability (MACC). The repeatable organizational ability to combine accounting and operating information, use it in planning and managerial decisions, coordinate resources, monitor deviations and risks, and turn feedback into corrective action. In this study, MACC was operationalized through three dimensions: information integration and decision use, resource allocation and cost control, and working-capital and risk control. The capability was assessed through the consistency between literature-based mechanisms, disclosed management actions, and related operating or financial movements.

Information integration and decision use. The process of bringing reliable financial and non-financial information into a specific managerial choice and reviewing what happens after the choice is implemented. In the Goldwind application, this dimension was observed through predictive-maintenance and operating-efficiency

evidence together with Wind Power Services revenue, cost, gross profit, and margin. An operating improvement is not treated as a complete financial gain unless the related profitability indicators also support it.

Resource allocation and cost control. The use of budgets, forecasts, cost information, investment review, responsibility, and feedback to direct scarce resources and revise commitments when conditions change. In this study, the dimension was observed through Goldwind's larger-turbine product mix and international-market allocation, with WTG and international revenue, cost, gross profit, and margin used to assess the financial outcome.

Working-capital and risk control. The coordinated monitoring of receivables, cash, impairment, financing exposure, debt maturity, and other risks that can affect liquidity and continuity. The study observed this dimension through receivable aging and loss allowances, credit and asset impairment, interest-bearing borrowings, net finance expense, gearing, the share of debt due within one year, and year-end cash. These indicators are read together because an improvement in financing cost can coexist with higher credit-loss or liquidity pressure.

Financial performance. The combined outcome of profitability, operating efficiency, cash-flow quality, and financial resilience. No single figure is treated as sufficient. The study therefore considered service, WTG, and international profitability together with efficiency, receivable exposure, impairment, financing cost, leverage, debt maturity, and cash indicators so that improvement in one area is not assumed to represent the firm's overall financial position.

Contextual fit. The alignment between the design and use of management controls and the conditions in which the firm operates, including strategy, market uncertainty, technology, data maturity, organizational structure, regulation, project timing, customer settlement, and financing conditions. Contextual fit was used as an interpretive condition rather than as a separate performance measure; it helps explain why the same control capability may produce different financial outcomes across situations.

# Chapter 2 Literature Review

## 2.1 Management Accounting Control Capability (MACC)

Management accounting control capability (MACC) refers to an organization's repeatable ability to use management accounting information and control practices to support decisions, coordinate resources, monitor performance and risk, and convert feedback into corrective action. It is broader than any single accounting tool. Budgets, forecasts, costing, variance analysis, performance measures, cash planning, and risk analysis contribute to MACC only when they are connected with reliable data, managerial judgment, responsibility, action, and follow-up (Ministry of Finance of the People's Republic of China, 2016; Möller et al., 2020; Fähndrich, 2023).

MACC is treated as a capability because its value lies in how a firm combines information, analytical knowledge, operating experience, decision routines, cross-functional relationships, and organizational learning rather than simply owning similar systems or reports. From the Resource-Based View, these combinations can become difficult to imitate and can support sustained value creation. Dynamic-capability research further emphasizes the need to sense changes, adjust decisions, and reconfigure resources as market and operating conditions shift (Barney, 1991; Henri, 2006; Teece, 2007; Schilke et al., 2018).

In financial-performance terms, MACC operates through a decision-and-feedback process. Information first improves visibility of operating conditions; managers then use that information to allocate resources and control costs; subsequent profitability, cash, financing, and risk outcomes provide feedback for the next decision. Management control systems research emphasizes targets, measures, responsibility, review, and corrective action, while contingency research indicates that the strength of the financial result depends on strategy, technology, uncertainty, project timing, and other contextual conditions (Simons, 1995; Otley, 1999; Chenhall, 2003; Anthony & Govindarajan, 2007).

Based on this literature, the study organizes MACC into three connected dimensions: information integration and decision use, resource allocation and cost control, and working-capital and risk control. The first concerns how information enters managerial decisions, the second how resources and costs are committed and reviewed, and the third how cash, exposure, financing, and risk consequences are monitored. These dimensions are examined separately in Sections 2.2 to 2.4 before being brought together in the conceptual framework in Section 2.6 (Webster & Watson, 2002; Malmi & Brown, 2008; Grabner & Moers, 2013; Snyder, 2019; Kraus et al., 2022).

A useful distinction in the literature is between management accounting techniques and management accounting control capability. Techniques such as budgeting, standard costing, investment appraisal, dashboards, and variance analysis provide information or formal procedures, but the presence of these tools does not show that they are used effectively. Capability becomes visible when managers

connect the tools to a decision, assign responsibility, review deviations, and revise action when conditions change. This distinction matters for performance research because firms may possess similar accounting systems but obtain different outcomes from them. The difference can arise from how information is interpreted, how quickly decisions are revised, and whether operational feedback reaches the managers who control resources (Malmi & Brown, 2008; Grabner & Moers, 2013; Merchant & Otley, 2020).

The Resource-Based View and management control systems literature are therefore complementary in explaining MACC. The Resource-Based View identifies the underlying bundle of knowledge, routines, relationships, and learning that can become valuable and difficult to imitate, whereas management control systems research explains how that bundle is activated through targets, measurement, discussion, responsibility, and feedback. Contingency Theory adds a boundary condition by showing that a control practice that works in one setting may be less useful in another. In project-based manufacturing, for example, long delivery cycles, technological change, customer settlement terms, and international operations can alter the timing and visibility of financial effects. MACC should consequently be assessed as an adaptable organizational process rather than as a fixed checklist of accounting practices (Barney, 1991; Simons, 1995; Chenhall, 2003; Otley, 2016).

This capability perspective also explains why financial performance in the present study is multi-dimensional. A management action may first improve an operating measure, later influence cost or margin, and only after that affect cash, financing, or risk exposure. The stages do not always move together or within the same reporting period. A useful assessment must therefore trace whether information is converted into a decision, whether the decision is reflected in resource use and profitability, and whether the resulting financial position remains sustainable. This staged logic provides the basis for separating MACC into the three dimensions used in the study while still treating them as parts of one connected management-control capability (Ittner & Larcker, 2001; Henri, 2006; Bedford, 2020).

## 2.2 Information Integration and Decision Use

Information integration links financial records with operational events across procurement, production, projects, sales, research and development, customer payment, and risk management. Reliable, timely, and comparable data allow managers to trace a financial variance to material prices, production yield, product mix, project delay, capacity utilization, warranty exposure, or collection timing.

Digitalization can improve the speed, detail, and accessibility of management information. Integrated systems and analytics support visibility across organizational functions, while automation can reduce repetitive processing and release finance personnel for analysis. These effects are conditional rather than automatic. Inconsistent definitions, weak data governance, limited analytical skills, and poor alignment with strategy can reduce the usefulness of digital information even when

the underlying technology is advanced (Möller et al., 2020; Fähndrich, 2023; Bedford et al., 2025).

This dimension brings reliable financial and operating data into management decisions and follows what happens after action is taken. It is evident when the information changes a specific choice and managers later review the operating and financial results (Simons, 1995; Ittner & Larcker, 2001; Henri, 2006).

For Goldwind, this dimension is associated with financial performance when digital operating information is linked to a specific managerial decision, produces observable operating feedback, and is followed by a corresponding financial result. Service revenue, cost, gross profit, and margin are therefore considered together with operating-efficiency evidence. If efficiency improves but profitability does not, the financial conversion remains incomplete. Reliable data, analytical skills, clear responsibility, and actual use of the information remain necessary (Mikalef et al., 2020; Mikalef & Gupta, 2021; Bedford et al., 2025).

A recurring distinction in the literature is the difference between information availability and information use. Digital systems can increase the volume, speed, and detail of data, but those features do not by themselves establish a performance benefit. Interactive control research emphasizes discussion, attention, and feedback, while empirical management-accounting research cautions against assuming that an improvement in a non-financial measure automatically produces a financial gain (Simons, 1995; Henri, 2006; Ittner & Larcker, 2001). Capability-based research makes a similar point: analytics creates value through complementary operational and dynamic capabilities rather than through technology ownership alone (Mikalef et al., 2020; Mikalef & Gupta, 2021).

This distinction defines the logic of the first research question. The relevant issue is not whether Goldwind possesses digital systems, but how the information integration and decision use dimension is associated with financial performance after a decision is made. The analysis therefore follows two linked stages: first, whether information use is associated with a measurable operating response; and second, whether that response is reflected in service profitability. A result can consequently be operationally favorable but financially qualified, which is more informative than treating digitalization as an automatically positive financial input.

The literature further suggests that information quality and information integration are related but not identical. High-quality accounting data may still have limited value if it remain separated from production, project, service, or customer information. Conversely, a highly integrated digital platform can create more data without improving decisions when definitions are inconsistent or managers lack the analytical capacity to interpret the output. The performance issue is therefore not simply whether information is accurate or timely, but whether financial and non-financial information can be connected to the same managerial problem. This is particularly important when an operational change has an indirect financial effect, because managers need to trace the path from the operating event to cost, margin,

cash, or risk rather than rely on a single dashboard measure (Möller et al., 2020; Fähndrich, 2023; Bedford et al., 2025).

Interactive use of information is another recurring theme. Diagnostic controls compare actual outcomes with predetermined targets and are useful for identifying deviations, while interactive controls direct management attention to uncertainties that require discussion and adaptation. The two uses are not substitutes. Routine variance monitoring can maintain discipline, but unexpected changes in technology, customer demand, project timing, or service conditions may require managers to question the original assumptions behind the target. Information integration contributes more strongly to MACC when it supports both functions: it makes deviations visible and also provides enough context for managers to decide whether the target, resource commitment, or operating response should change (Simons, 1995; Henri, 2006; Bedford, 2020).

Prior research on analytics reaches a similar conclusion. Data and analytical technologies can strengthen sensing and decision speed, but their financial value depends on complementary capabilities such as managerial expertise, process redesign, cross-functional coordination, and follow-up. This helps explain why the first dimension in the present framework does not use the existence of digital systems as evidence of improved financial performance. The stronger test is whether information use produces an observable operating response and whether that response is subsequently reflected in relevant profitability indicators. By separating operating improvement from financial conversion, the framework avoids treating technology adoption itself as the outcome (Mikalef et al., 2020; Mikalef & Gupta, 2021).

## 2.3 Resource Allocation and Cost Control

Resource allocation and cost control concerns the difficult choice of where scarce capital, engineering talent, supplier capacity, research and development spending, production resources, and management attention should be placed. Budgets and forecasts translate strategic priorities into commitments, while costing, investment appraisal, variance analysis, and responsibility accounting provide the information needed to review those commitments when market or project conditions change.

Targets set the reference point, while budgets, forecasts, investment approval, costing, and variance review guide resource commitments. Management Control Systems Theory focuses on responsibility and feedback when assumptions change. The Resource-Based View treats the ability to reallocate resources repeatedly as the valuable capability, and Contingency Theory requires each allocation to fit demand, turbine technology, project timing, and geography (Simons, 1995; Otley, 1999; Anthony & Govindarajan, 2007).

For Goldwind, the second dimension links product and market choices with their later financial results. The analysis compares growth in WTG and international revenue with the related changes in cost, gross profit, and margin. When profit and

margin improve in the same product or regional category, the observable financial evidence is more clearly supported.

Effective cost control does not mean minimum expenditure. Rigid targets can reduce maintenance, training, product development, or supplier resilience; centralized approval can limit unauthorized spending but delay response; and short payback requirements can exclude strategically necessary technology. Favorable financial outcomes depend on a balance between discipline and adaptation and on the management of tensions among controls (Bedford et al., 2016; van der Kolk et al., 2020).

The literature also shows that resource allocation and cost control are complementary rather than interchangeable. Budgeting and costing create discipline around commitments, but rigid controls can become counterproductive when demand, technology, project timing, or geographic priorities change. Performance management therefore requires both control and adaptation: managers need a basis for committing resources and a mechanism for revisiting those commitments when assumptions no longer hold (Bedford et al., 2016; van der Kolk et al., 2020; Nudurupati et al., 2021). From an RBV perspective, the valuable capability lies in repeatedly reallocating resources with better information, not simply in reducing expenditure.

This reasoning shapes the second research question. Revenue growth alone is insufficient evidence of a favorable association because it can reflect scale, market demand, or timing rather than improved resource use. The study therefore compares revenue with cost, gross profit, and margin within the same product and regional categories. When revenue grows faster than cost and margins also improve, the observable financial evidence is more internally consistent. This approach does not remove alternative explanations, but it reduces the risk of treating sales growth by itself as proof of stronger financial performance.

Resource allocation is closely linked to strategy because budgets and investment decisions determine which products, markets, technologies, and projects receive organizational attention. In a stable environment, fixed targets can provide a useful discipline. In a changing environment, however, the initial allocation may become outdated before the budget period ends. Management control therefore has to perform two tasks at the same time: protect the firm from uncontrolled spending and allow resources to move when new information changes the expected return. The literature on control packages emphasizes this balance, showing that individual controls should be considered in combination rather than assuming that tighter control is always better (Malmi & Brown, 2008; Bedford et al., 2016; Merchant & Otley, 2020).

Cost control should likewise be interpreted through value creation rather than simple expenditure reduction. Cutting cost can improve a short-term accounting measure while weakening product quality, maintenance, innovation, supplier reliability, or future market capacity. In contrast, an increase in cost can be economically reasonable when it supports a larger increase in revenue or strengthens the margin generated by a strategic activity. For this reason, the literature supports

examining cost together with the resource commitment that created it and the financial result that followed. This approach is consistent with performance-management research that evaluates the relationship among targets, actions, and outcomes instead of judging one cost figure in isolation (Otley, 1999; Anthony & Govindarajan, 2007; Nudurupati et al., 2021).

The financial-conversion logic used in this study follows directly from that argument. If a product or market receives more resources, revenue growth alone cannot show whether the allocation was financially effective. A more convincing pattern is present when revenue grows faster than the associated cost, gross profit increases, and margin also widens within the same reporting category. The combination reduces, although it does not eliminate, the possibility that the result merely reflects greater sales volume. It also provides a consistent rule for comparing Goldwind's product and international-market evidence while recognizing that demand, price, turbine mix, and project timing can also influence the observed outcome (Bedford et al., 2016; van der Kolk et al., 2020; Otley, 2016).

## 2.4 Working-Capital and Risk Control

In the Goldwind application, the working-capital and risk control dimension is examined as a connected set of receivable, impairment, financing, and maturity decisions. The analysis follows receivable aging and loss allowances, the effect of impairment on profit, and changes in borrowings, net finance expense, gearing, and the share of debt due within one year.

A lower overdue-receivable share, fewer borrowings, lower net finance expense, and lower gearing point to better exposure or financing management. Higher loss allowances, higher impairment, or a larger short-term debt share point to continuing profit and liquidity pressure. The dimension must therefore be judged from the full pattern, not from one favorable figure (Deloof, 2003; Boisjoly et al., 2020; Kiymaz et al., 2024).

Risk control extends beyond working capital to customer credit, guarantees, foreign exchange, interest rates, project execution, product warranty, impairment, supply interruption, financing conditions, and regulatory change. Enterprise risk management links objectives with risk identification, assessment, response, information, and monitoring. Financial value depends on thresholds, escalation, response ownership, and follow-up rather than on a risk register or annual certification alone (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2013; Anton & Nucu, 2020).

Integrated information and management control can support resilience through anticipation before disruption, coping during financial or operational pressure, and adaptation after experience. A profitable enterprise can still face weak operating cash flow, rising leverage, or concentrated exposure. The working-capital and risk control dimension is therefore associated with cash-flow quality and financial resilience and

can also protect the continuity of profitability and operating efficiency (Roffia & Dabić, 2024; Weber et al., 2024).

Working-capital research consistently highlights a trade-off between profitability and liquidity. Tighter receivable and cash management can reduce funding needs, yet excessively aggressive working-capital policies may constrain operations or shift risk elsewhere. Cross-country evidence also suggests that the relationship between working capital and firm performance varies with financing conditions and institutional context (Deloof, 2003; Boisjoly et al., 2020; Kiymaz et al., 2024). Risk-control and resilience research broadens the issue further by emphasizing anticipation, response capacity, and the ability to continue operating under financial or operational pressure (Anton & Nucu, 2020; Roffia & Dabić, 2024; Weber et al., 2024).

The third research question therefore requires a combined reading of exposure, loss recognition, financing, maturity, and cash. A higher impairment charge is not automatically evidence of weaker control because it may reflect more timely recognition of an existing exposure; however, it still reduces current-period profit. Likewise, lower borrowing costs do not by themselves establish stronger financial resilience if short-term debt concentration rises or cash falls. The analysis treats these offsetting channels as part of the result rather than as noise, allowing a mixed association to be reported when favorable financing indicators coexist with continuing credit-loss or liquidity pressure.

Working-capital control affects performance through both profitability and liquidity channels. Receivables and inventory support sales and project execution, but they also tie up funds and can increase the need for external financing. A very loose policy can therefore increase credit exposure and financing cost, while an excessively tight policy may restrict commercially necessary terms or interrupt operations. Empirical working-capital research commonly finds that the relationship with performance is shaped by this trade-off rather than by a simple rule that lower working capital is always better. The relevant question is whether the firm can support operations while limiting the amount, duration, and risk of capital tied up in the operating cycle (Deloof, 2003; Boisjoly et al., 2020; Kiymaz et al., 2024).

Risk recognition introduces an additional interpretation problem. An increase in loss allowance or impairment reduces reported profit, but it can also reflect earlier or more complete recognition of an exposure that already exists. A lower impairment charge is therefore not automatically evidence of stronger control, just as a higher charge is not automatically evidence of control failure. The analytical focus should be on whether credit exposure, loss recognition, financing decisions, and liquidity indicators tell a consistent story. Enterprise-risk-management literature supports this integrated view because effective risk control depends on identification, escalation, response, ownership, and monitoring rather than on the existence of a formal risk register alone (COSO, 2013; Anton & Nucu, 2020).

The timing of these effects is also important in project-based manufacturing. A sale can be recognized before cash is collected, a financing decision can reduce

current interest expense while increasing near-term refinancing concentration, and a provision can reduce current profit while improving the transparency of future risk. These timing differences mean that profitability, cash, leverage, and resilience may move in different directions in the same year. The third dimension therefore treats offsetting evidence as part of the finding rather than attempting to force all indicators into a positive or negative score. This approach is consistent with resilience research, which emphasizes a firm's capacity to absorb pressure and continue operating as well as its current-period accounting result (Roffia & Dabić, 2024; Weber et al., 2024).

## 2.5 Goldwind Company Profile

Goldwind Science & Technology Co., Ltd. is an SZSE- and HKEX-listed clean-energy company. Its official profile describes a business structure covering energy development, energy devices, energy services, and energy use. The company combines wind-power equipment with planning, engineering, operation and maintenance, asset management, and energy-use solutions, supported by an international research and business network (Goldwind Science & Technology Co., Ltd., n.d.).

At the consolidated-group level, the 2025 financial statements report four principal revenue categories: wind-turbine generator manufacturing and sales, wind-farm development, wind-power services, and other businesses. Manufacturing and sales transfer mainly at a point in time, while service activities can be recognized over time. Product development, procurement, production, delivery, installation, project acceptance, warranty obligations, and customer collection therefore occur across different operating and financial periods (Goldwind Science & Technology Co., Ltd., 2026b).

Goldwind's 2025 disclosures describe a four-in-one structure integrating wind-power manufacturing, services, investment, and load-side Wind Power+ activities. External wind-turbine sales increased from 16,052.99 MW in 2024 to 26,626.37 MW in 2025, or 65.87%, and international revenue increased from RMB12,007.55 million to RMB18,081.61 million, or 50.59%. These movements provide the operating context for examining product and market allocation (Goldwind Science & Technology Co., Ltd., 2026b).

Goldwind was used in this study as an application context rather than as the source from which the three MACC dimensions were constructed. Its business model made the literature-based framework observable because manufacturing, project delivery, services, international operations, customer settlement, and financing occurred within the same consolidated group. These activities created different points at which information, resource allocation, cost control, working capital, and risk could influence financial outcomes. The company profile therefore served to connect the general literature to the indicators used later in the analysis; it did not replace the literature review or imply that Goldwind's disclosed practices define MACC for other firms.

## 2.6 Conceptual Framework

The conceptual framework links each of the three dimensions with financial performance. The Resource-Based View is the main theoretical lens. Management Control Systems Theory explains how each dimension works through decisions and feedback, while Contingency Theory explains the conditions that may strengthen or weaken the result.

The three paths capture different stages of the control process. Information integration and decision use is expected to strengthen the quality and follow-up of decisions. Resource allocation and cost control examines whether those choices are converted into stronger product and international profitability. Working-capital and risk control then considers the credit, impairment, financing, and liquidity consequences that remain after resources have been committed. Read together, the paths show whether an operating improvement becomes a financial gain and whether that gain remains sustainable under cash and risk pressure.

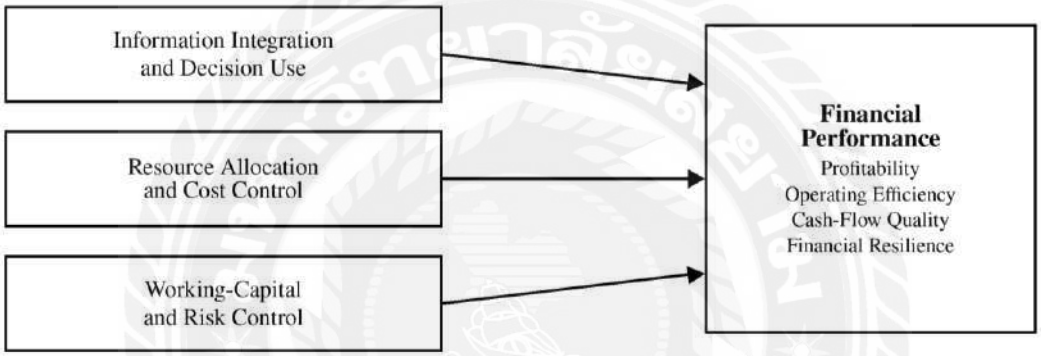
Figure 2.1 deliberately presents only the three dimension-to-performance paths. The Resource-Based View provides the principal capability lens for interpreting these paths. Management Control Systems Theory is not treated as a separate causal path; it explains how information, targets, responsibility, action, and feedback activate each capability. Contingency Theory is also not a separate path; it is used to interpret why the same capability may produce different financial manifestations under different market, project, technology, settlement, and financing conditions. This keeps the diagram simple while preserving the distinct role of each theory.

Accordingly, the framework does not assume that all three dimensions will show the same strength or direction of association. The first research question focuses on the conversion of information use into operating and service-profit outcomes; the second focuses on whether resource commitments are accompanied by stronger product and regional profitability; and the third focuses on whether exposure and financing improvements remain sustainable after impairment, maturity, and cash pressure are considered. The three questions are therefore parallel in structure but distinct in their financial manifestations.

The framework was derived by grouping recurring concepts in the literature according to the stage of the management-control process they primarily describe. Work on digitalization, analytics, information quality, and interactive control was grouped around information integration and decision use. Literature on budgeting, costing, investment review, performance management, and adaptive control was grouped around resource allocation and cost control. Research on working capital, enterprise risk management, impairment, financing, and resilience was grouped around working-capital and risk control. This concept-centric synthesis reduces overlap among individual techniques and keeps the framework focused on the organizational capability that links information, managerial action, and financial feedback (Webster & Watson, 2002; Snyder, 2019; Kraus et al., 2022).

The three paths should therefore be read as analytical relationships rather than independent mechanical causes. Information can support a better decision without producing an immediate margin gain; resource allocation can improve profitability while later increasing working-capital pressure; and risk control can strengthen resilience while recognizing a short-term accounting loss. The framework allows these different outcomes because it evaluates each dimension through indicators that correspond to its mechanism and then compares the completeness and consistency of the evidence. This is also why the study does not combine the three dimensions into a single MACC score. The purpose is to identify where the capability-to-performance chain appears complete, where it is only partial, and where favorable and unfavorable financial effects coexist (Malmi & Brown, 2008; Grabner & Moers, 2013; Gerdin, 2020).

Figure 2.1 Conceptual Framework




Source: Developed from Barney (1991), Simons (1995), Otley (1999), Chenhall (2003), and Henri (2006).

# Chapter 3 Research Methodology

## 3.1 Research Design

This study used document analysis as its primary research method. Academic sources were reviewed, compared, and synthesized to establish the theoretical foundation and to identify three dimensions of management accounting control capability (MACC): information integration and decision use, resource allocation and cost control, and working-capital and risk control. The review also established the expected relationship between each dimension and financial performance, providing the basis for the analytical framework used in the study.

This approach suited the research questions because they require established management accounting and control concepts to be brought together and then examined in a specific company context. Forty non-company sources connected the Resource-Based View, Management Control Systems Theory, Contingency Theory, and prior work on information use, resource allocation, working capital, risk control, and performance. From this synthesis, three analytical lines were developed to correspond directly with the three research questions and objectives.

Three analytical lines guided the analysis. The first considered the observable association between the information integration and decision use dimension and both operating efficiency and Wind Power Services profitability. The second considered the resource allocation and cost control dimension in relation to WTG and international profitability. The third considered the working-capital and risk control dimension in relation to credit exposure, impairment, financing efficiency, leverage, and short-term liquidity. The same three analytical lines were carried through the research instrument, data collection, analysis, and conclusions.

Although the three research questions used different indicators, they followed the same evidence protocol. For the first question, operating-efficiency evidence was read together with Wind Power Services profitability; for the second, product and regional revenue-cost-profit patterns were compared within the same categories; for the third, credit exposure, impairment, financing, maturity, and cash indicators were interpreted together. This common protocol supported comparison across the three dimensions without forcing unlike measures onto a single scale. The cross-dimension comparison therefore evaluated the completeness and consistency of evidence rather than estimating comparable effect sizes.

Goldwind served as the company case for applying the literature-based framework. Its official profile, 2025 Annual Report and audited financial statements, Sustainability Report, and impairment announcements supplied the supporting company evidence. For each analytical line, the analysis moved from the relationship established in the literature, to a related disclosed management action, and then to the corresponding operating or financial indicator. The 2021–2025 series showed the broader direction, while detailed dimension-to-performance matching focused on 2024 and 2025.

Evidence for an analytical line was treated as stronger when the literature-based mechanism, the disclosed Goldwind action, and the related financial movement were consistent with one another; mixed or opposing evidence limited the conclusion. The study therefore assessed whether Goldwind's observable evidence was consistent with relationships established through the literature review. It did not attempt to establish isolated statistical causation, and the terms supported, qualified, and mixed refer to evidence consistency rather than statistical significance or proof of sole causation.

## 3.2 Research Instrument

The research instrument was a structured, literature-based analytical matrix, presented in Table 3.1. It organizes the three MACC dimensions into practical lines of analysis and records the relevant management evidence, core operating or financial indicators, and the rule used to interpret the result. Information integration and decision use is linked with predictive maintenance, operating efficiency, and Wind Power Services profitability; resource allocation and cost control is linked with larger-turbine and international-market allocation; and working-capital and risk control is linked with receivable, impairment, financing, and maturity indicators.

For each analytical line, evidence was recorded in the same sequence: literature-based relationship, disclosed Goldwind action, corresponding indicator movement, and overall assessment. This common structure makes the three dimensions comparable without treating unlike financial measures as if they were measured on the same scale.

Table 3.1 Analytical Framework for the Three MACC Dimensions

| MACC dimension | Integrated management evidence | Core financial-performance indicators | Evaluation rule |
|---|---|---|---|
| Information integration and decision use | Predictive maintenance and digital operating decisions | Unplanned downtime and client O&M cost; Wind Power Services revenue, cost, gross profit, and margin | Efficiency improvement is financially supportive only when service profit or margin also improves |
| Resource allocation and cost control | Larger-turbine product mix and international-market allocation | WTG and international revenue, cost, gross profit, and margin | A stronger same-category revenue-cost-profit pattern indicates stronger observable financial evidence |
| Working-capital and risk control | Receivable, impairment, financing, and maturity management | Receivable aging and loss allowance; impairment effect; borrowings, net finance expense, gearing, and short-term debt share | Financial evidence is favorable only when financing and exposure improve without offsetting loss or liquidity pressure |

## 3.3 Data Collection

The literature search and source verification were finalized on August 13, 2026. The review was organized as an integrative, concept-centric literature review. Searches were conducted through ScienceDirect, SpringerLink, Wiley Online Library, SAGE Journals, publisher and DOI records, and backward citation tracking. Search combinations followed the constructs used in the framework, including management accounting and management control systems, Resource-Based View and capability, digitalization and analytics, resource allocation and cost control, working capital, risk and resilience, and financial performance. Forty non-company sources published from 1980 to 2025 were retained because they directly defined the theoretical foundations, explained one or more of the three dimension-to-performance mechanisms, supported the indicator logic, or provided literature-review methodology.

Sources were retained when they were peer-reviewed scholarly works, established academic books, or authoritative institutional guidance with a direct role in the analytical framework. Duplicate records, sources without a clear conceptual or indicator contribution, and technical engineering materials lacking a management-accounting or financial-performance connection were excluded from the core evidence. Goldwind documents were kept separate from the 40-source literature

corpus and used only for the company application. The review was designed to provide a transparent theoretical synthesis rather than to claim exhaustive coverage of every publication in the field.

Company evidence was taken from Goldwind's official website and announcement archive. It included the company profile, 2025 Annual Report and audited statements, 2025 Sustainability Report, and the 2024 and 2025 impairment announcements. These records covered digital operating actions, product and market allocations, credit and financing information, and the related 2024 and 2025 figures used in the instrument. Each percentage comparison used amounts reported within the same official table and accounting basis; consolidated IFRS highlights were used for the five-year direction, while detailed business and regional comparisons used the relevant audited annual-report disclosure (Goldwind Science & Technology Co., Ltd., n.d., 2025, 2026a, 2026b, 2026c).

## 3.4 Data Analysis

The documents were analyzed using the analytical matrix and structured comparative analysis. Goldwind's evidence was matched to the three lines in Table 3.1: predictive maintenance and digital operating decisions were compared with operating efficiency and Wind Power Services profitability; larger-turbine and international-market decisions were compared with product and regional profitability; and receivable, impairment, financing, gearing, and maturity indicators were considered together under working-capital and risk control. Within each line, 2024 and 2025 figures were compared on a consistent basis before the three results were compared with one another.

No composite MACC score or common effect size was calculated because the three dimensions use different operating and financial indicators. Evidence strength was judged by three criteria: the specificity of the action-indicator match, the internal consistency of the related financial movements, and the presence of material offsetting evidence. The ranking therefore identified the clearest observable financial evidence rather than a statistically comparable causal effect size.

# Chapter 4 Findings and Discussion

## 4.1 Findings

To present how each finding was obtained, the same evidence sequence was applied to all three research questions. First, the evaluation rule developed from the literature and summarized in Table 3.1 was identified. Second, a disclosed Goldwind action, decision, or exposure was matched to that rule. Third, the corresponding 2024 and 2025 indicators were extracted from the same official reporting table and accounting basis. Year-on-year change was calculated as (2025 value - 2024 value) / 2024 value x 100. Gross profit was checked as revenue minus cost, gross margin as gross profit / revenue x 100, and changes in ratios were expressed in percentage points. Fourth, the direction and consistency of the movements were compared with the evaluation rule.

The final assessment therefore came from the evidence chain rather than from a single number. A result was treated as stronger when the disclosed action and the related operating and financial indicators moved consistently with the literature-based mechanism. It was qualified when an operating improvement was not followed by a corresponding profitability improvement, and it was treated as mixed when favorable financing or exposure indicators coexisted with material loss or liquidity pressure. No composite MACC score was calculated because the three dimensions use different indicators.

### 4.1.1 Findings on Information Integration and Decision Use

The process for the first research question started with the rule in Table 3.1: information integration and decision use would be financially supportive only if an observable operating improvement was followed by stronger service profitability. The company-action step used Goldwind's disclosed predictive-maintenance and cross-regional optimization practices. The reported operating outcomes were a reduction of more than 40% in unplanned downtime and a 25% reduction in clients' operation-and-maintenance costs. This established the first link in the chain - information was connected with a specific operating decision and a measurable operating response (Goldwind Science & Technology Co., Ltd., 2026c).

The next step tested whether that operating response was converted into financial performance. From the 2024 and 2025 Wind Power Services data, revenue increased from RMB5,507.03 million to RMB5,715.54 million. The year-on-year calculation, (5,715.54 - 5,507.03) / 5,507.03, gives 3.79%. Service cost increased from RMB4,323.06 million to RMB4,551.83 million, or 5.29%. Gross profit, calculated as revenue minus cost, therefore moved from RMB1,183.97 million to RMB1,163.71 million, a decrease of about 1.71% (Goldwind Science & Technology Co., Ltd., 2026b).

The margin calculation provides the final financial check. Gross profit divided by revenue gives approximately 21.50% in 2024 and 20.36% in 2025, so the margin

fell by 1.14 percentage points. Revenue therefore increased, but cost increased faster and both gross profit and margin weakened. The operating evidence and financial evidence did not move in the same direction.

Applying the evaluation rule, the first dimension is supported at the operating-efficiency stage but not fully at the profitability stage. The result was therefore classified as operationally positive and financially qualified. This classification is not a direct judgment based on the 40% or 25% efficiency figures alone; it follows from comparing those operating gains with the subsequent service revenue-cost-profit pattern (Goldwind Science & Technology Co., Ltd., 2026b, 2026c).

### 4.1.2 Findings on Resource Allocation and Cost Control

The second research question used a different evaluation rule because the relevant financial outcome is product and market profitability. Table 3.1 treats the evidence as stronger when revenue grows faster than cost and gross profit and margin improve within the same category. Goldwind's larger-turbine product mix and international-market allocation were therefore matched with WTG and international revenue, cost, gross profit, and margin rather than with total-company revenue alone (Goldwind Science & Technology Co., Ltd., 2026b).

For WTG, revenue increased from RMB38,920.58 million in 2024 to RMB57,205.22 million in 2025. The calculation, (57,205.22 - 38,920.58) / 38,920.58, gives 46.98%. Cost increased from RMB36,955.62 million to RMB52,085.27 million, or 40.94%. Gross profit was then checked as revenue minus cost: RMB1,964.96 million in 2024 and RMB5,119.95 million in 2025, an increase of about 160.56%. The margin calculation gives about 5.05% in 2024 and 8.95% in 2025, an increase of 3.90 percentage points. Revenue growth therefore exceeded cost growth by about 6.04 percentage points.

The same sequence was then repeated for the international business. International revenue rose 50.59%, from RMB12,007.55 million to RMB18,081.61 million, while international cost rose 32.32%. The revenue-growth rate therefore exceeded the cost-growth rate by 18.27 percentage points. The international margin increased from 13.84% to 24.29%, a gain of 10.45 percentage points. This second comparison is important because it tests the same revenue-cost-profit logic under a geographic classification rather than relying only on the WTG product category (Goldwind Science & Technology Co., Ltd., 2026b).

Applying the evaluation rule, both comparisons point in the same direction: revenue grew faster than cost and margins expanded. The second dimension was therefore classified as the strongest and most internally consistent observable financial evidence among the three dimensions. The conclusion is based on the agreement of the product and geographic comparisons, not on revenue growth by itself, and the same-period alignment does not establish management control as the sole cause of the improvement.

### 4.1.3 Findings on Working-Capital and Risk Control

The third research question required a combined assessment because no single working-capital or risk indicator is sufficient. The rule in Table 3.1 treats the evidence as favorable only when exposure and financing improve without material offsetting loss or liquidity pressure. The analysis was therefore divided into four linked groups: receivable exposure, recognized losses, financing efficiency, and short-term liquidity. The direction of each group was established first, and the groups were then read together rather than converted into one numerical score.

For credit exposure and loss recognition, the share of trade receivables older than one year fell from 42.90% in 2024 to 40.10% in 2025, an improvement of 2.80 percentage points. However, gross trade receivables increased 5.47%, while the loss allowance rose from RMB2,014.95 million to RMB2,291.67 million, or 13.73%. The allowance rate consequently increased from 6.14% to 6.62%, a rise of 0.48 percentage points. Credit and asset impairment also increased from RMB1,149.90 million to RMB1,338.14 million, or 16.37%, and the 2025 impairment reduced attributable profit by RMB966.74 million (Goldwind Science & Technology Co., Ltd., 2025, 2026a, 2026b).

The financing and liquidity step produced a different direction. Interest-bearing borrowings fell from RMB42,049.20 million to RMB38,865.20 million, a decrease of 7.57%; net finance expense fell from RMB906.92 million to RMB724.36 million, or 20.13%; and gearing fell by 1.93 percentage points. At the same time, debt due within one year increased from 55.58% to 57.55% of total debt, a rise of 1.97 percentage points, while year-end cash and cash equivalents fell from RMB11.13 billion to RMB9.51 billion, or about 14.57% (Goldwind Science & Technology Co., Ltd., 2026b).

Applying the evaluation rule required both sides of this pattern to be retained. Receivable aging, borrowings, finance expense, and gearing moved favorably, but loss allowances, impairment, short-term maturity concentration, and cash moved unfavorably. Because the favorable financing and exposure movements were materially offset by profit and liquidity pressure, the third dimension was classified as mixed rather than positive or negative. This is how the result was derived: the conclusion comes from the combined direction of the indicator groups, not from selecting the most favorable individual ratio.

Taken together, the three evidence chains distinguish operating-efficiency, product-and-market profitability, and financial-resilience outcomes. Table 4.1 summarizes the disclosed evidence only after the action, indicator calculation, and evaluation-rule steps above have been completed for each dimension.

Table 4.1 Summary of Findings

| MACC dimension | Goldwind evidence | Key financial manifestation | Finding |
|---|---|---|---|
| Information integration and decision use | Predictive maintenance and digital operating decisions | Downtime >40% lower and client O&M cost -25%; service revenue +3.79%, gross profit about -1.71%, margin -1.14 pp | Operating evidence strong; 2025 service-profit conversion not supported |
| Resource allocation and cost control | Larger-turbine and international-market allocation | WTG gross profit about +160.56%, margin +3.90 pp; international margin +10.45 pp | Strongest and most consistent observable financial evidence |
| Working-capital and risk control | Receivable, impairment, financing, and maturity management | >1-year receivable share -2.80 pp; net finance expense -20.13%; impairment +16.37%; <1-year debt share +1.97 pp | Aging and financing improved; loss and short-term liquidity pressure remained |

### 4.1.4 Five-Year Financial Direction

The five-year series was used as a contextual check rather than as direct evidence for any one MACC dimension. The values were taken from the consolidated IFRS highlights in Goldwind's 2025 Annual Report and converted to RMB100 million on a consistent basis. The process was to trace the direction of revenue, attributable profit, cash and cash equivalents, total assets, and total liabilities from 2021 to 2025, and then compare the 2025 recovery with earlier levels. Between 2024 and 2025, revenue increased from RMB56.52 billion to RMB72.78 billion, or about 28.78%, and profit attributable to owners increased from RMB1.86 billion to RMB2.77 billion, or about 49.14%. Over the same period, cash and cash equivalents fell from RMB11.13 billion to RMB9.51 billion, or about 14.57%.

Across the full 2021-2025 period, revenue moved from RMB50.75 billion to RMB46.25 billion, RMB50.24 billion, RMB56.52 billion, and RMB72.78 billion. Profit attributable to owners fell from RMB3.73 billion in 2021 to RMB1.33 billion in 2023 before recovering to RMB2.77 billion in 2025, still below the 2021 level. Cash and cash equivalents peaked at RMB15.25 billion in 2022 and declined to RMB9.51 billion in 2025, while both total assets and total liabilities expanded. The contextual check therefore shows that strong 2025 revenue and profit recovery coexisted with lower cash reserves and a larger balance sheet. This supports the chapter's use of multiple indicators instead of treating one headline result as sufficient evidence of financial improvement.

Table 4.2 Goldwind Financial Highlights, 2021–2025

| Indicator (RMB 100 million) | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| Revenue | 507.46 | 462.54 | 502.44 | 565.16 | 727.82 |
| Profit attributable to owners | 37.31 | 23.83 | 13.31 | 18.60 | 27.74 |
| Cash and cash equivalents | 81.41 | 152.46 | 136.94 | 111.33 | 95.11 |
| Total assets | 1,196.65 | 1,368.22 | 1,434.95 | 1,552.24 | 1,664.95 |
| Total liabilities | 829.37 | 964.76 | 1,032.66 | 1,147.97 | 1,193.14 |

Note: Figures are consolidated IFRS amounts converted from RMB thousand to RMB 100 million and are used only for the five-year financial direction. The 2021 revenue figure is restated in the 2025 Annual Report. Detailed 2024–2025 event matches use audited amounts and definitions from the cited business or regional table. Because the official annual-report materials contain consolidated IFRS highlights and detailed A-share/PRC GAAP disclosures, percentage comparisons are made only within the same source table and are not reconciled across accounting bases. Source: Goldwind Science & Technology Co., Ltd. (2026b), Financial Highlights for the Past Five Financial Years.

## 4.2 Discussion

The calculation and classification process in Section 4.1 establishes how the three findings were derived; this section interprets why those evidence patterns are theoretically meaningful. The findings remain structured evidence rather than isolated causal estimates. Each dimension was assessed by matching a literature-based mechanism, a disclosed Goldwind action, and a related indicator, while market demand, project timing, contracts, settlement cycles, and financing conditions remain alternative or moderating explanations.

### 4.2.1 Discussion on Information Integration and Decision Use

The information integration and decision use dimension shows a clear link from action to operating result, but the next step—from operating improvement to financial gain—is weaker. Lower downtime and lower client operation-and-maintenance cost indicate that predictive information was used in maintenance and optimization decisions. Yet Wind Power Services revenue increased by 3.79% while cost rose by 5.29%; gross profit fell about 1.71% and margin declined by 1.14 percentage points. The operating gains therefore cannot be treated as a substitute for segment profitability (Goldwind Science & Technology Co., Ltd., 2026b, 2026c).

This pattern is consistent with literature that treats digitalization as valuable when data and analytics are embedded in managerial routines rather than merely installed as technology (Möller et al., 2020; Fähndrich, 2023; Bedford et al., 2025). The Resource-Based View explains the combination of operating data, forecasting

models, service knowledge, and routines as the capability; Management Control Systems Theory explains the information-decision-feedback sequence (Henri, 2006; Simons, 1995). The lower service margin nevertheless qualifies a simple claim of immediate financial improvement. Contingency Theory provides the explanation: contract mix, project coverage, and service cost can moderate or delay the conversion of operating gains into profitability (Chenhall, 2003; Otley, 2016).

For the first research question, the evidence therefore indicates a two-stage association rather than one uniform result. The information integration and decision use dimension is associated with stronger operating performance, but the 2025 service-profitability evidence does not show the same improvement. This distinction is academically important because an organizational capability can improve process quality without producing an immediate or proportional accounting return. Contract terms, service scope, cost structure, warranty obligations, and the timing of revenue and expense recognition can absorb or delay the financial conversion. The first question therefore shows a favorable association at the operating stage but only a qualified association at the profitability stage, which is consistent with the literature's caution against assuming a simple cause-and-effect chain from non-financial to financial measures (Ittner & Larcker, 2001).

### 4.2.2 Discussion on Resource Allocation and Cost Control

The resource allocation and cost control dimension provides a more consistent financial pattern because two same-category comparisons move in the same direction. In WTG, revenue grew 46.98% while cost grew 40.94%, lifting gross profit by about 160.56% and margin by 3.90 percentage points, from about 5.05% to 8.95%. Internationally, revenue grew 50.59% while cost grew 32.32%, and margin increased by 10.45 percentage points. The strength of this result comes from revenue growing faster than cost and from the resulting margin expansion, not from revenue growth by itself (Goldwind Science & Technology Co., Ltd., 2026b).

The result agrees with management-control literature that links strategic objectives, resource commitments, costing, and performance review instead of evaluating each control in isolation (Otley, 1999; Anthony & Govindarajan, 2007; Bedford et al., 2016). From the Resource-Based View, repeated reallocation of technology, engineering capacity, and market effort is the relevant capability. Management Control Systems Theory explains how targets and cost feedback discipline the commitment. Contingency Theory limits the inference because external demand, turbine mix, project timing, and geography also affected the outcome. The evidence is therefore strongly consistent with the expected mechanism, but it does not establish management control as the sole explanation for the 2025 margin gains.

The second research question is therefore supported by two mutually reinforcing financial views: a product-category comparison and a geographic comparison. Their alignment increases the internal consistency of the evidence because profitability improves under two different classifications reported for the same period. At the same time, the result should not be interpreted as a standalone

estimate of the return to management control. External demand, turbine mix, project timing, and overseas market conditions can also affect revenue and margins. The contribution of the analysis is narrower but defensible: the observed pattern is strongly consistent with the literature-based expectation that disciplined and adaptive resource allocation is associated with better financial conversion when revenue growth is accompanied by slower cost growth and wider margins.

### 4.2.3 Discussion on Working-Capital and Risk Control

The working-capital and risk control dimension presents a less straightforward picture. The share of receivables older than one year declined by 2.80 percentage points, but gross receivables rose 5.47%, the loss allowance increased 13.73%, and the allowance rate moved from 6.14% to 6.62%. Credit and asset impairment also rose 16.37% and reduced 2025 attributable profit by RMB966.74 million. A larger impairment charge is not automatically evidence of weak monitoring—it can also reflect more complete recognition of exposure—but it still reduces current-period profit (Goldwind Science & Technology Co., Ltd., 2025, 2026a, 2026b).

Financing efficiency improved at the same time: borrowings, net finance expense, and gearing all fell. Yet the proportion of debt due within one year rose 1.97 percentage points and year-end cash fell about 14.57%. This trade-off is consistent with literature showing that working-capital choices are related to profitability and valuation but must be assessed together with liquidity and financing risk (Deloof, 2003; Boisjoly et al., 2020; Kiymaz et al., 2024). It also supports the view of management control as a system or package: receivable monitoring, impairment, borrowing, and maturity control can produce offsetting outcomes and should not be judged separately (Malmi & Brown, 2008; Bedford, 2020; Merchant & Otley, 2020).

For the third research question, the mixed pattern is itself a substantive finding. The working-capital and risk control dimension is not designed only to maximize current-period profit; it also protects the firm's ability to absorb losses, refinance obligations, and continue operating. Some risk-control actions may therefore improve resilience while creating or recognizing a short-term accounting cost. In Goldwind's case, lower borrowing and financing cost coexist with higher loss recognition, greater short-term maturity concentration, and lower cash. The association with financial performance is thus favorable in selected exposure and financing channels but constrained in profit and liquidity channels. This interpretation is consistent with resilience-oriented control research, which treats continuity and adaptation as outcomes that cannot be captured by one profitability measure (Roffia & Dabić, 2024; Weber et al., 2024).

### 4.2.4 Integrated Theoretical Interpretation

The five-year direction in Table 4.2 reinforces this multi-dimensional interpretation. Revenue and attributable profit recovered strongly in 2025, but profit remained below its 2021 level, cash was below its 2022 peak, and both assets and liabilities expanded. Growth, profitability recovery, liquidity, and balance-sheet exposure therefore did not improve at the same rate. A single revenue or profit

measure would overstate the uniformity of the result, whereas the three-dimension framework identifies where operating, allocation, credit, financing, and liquidity outcomes diverged.

Seen through the three theories, the results fit a common sequence without becoming identical. The Resource-Based View treats integrated information, resource reallocation, and risk response as organizational capabilities. Management Control Systems Theory shows how those capabilities enter targets, decisions, responsibility, measurement, and feedback. Contingency Theory then helps explain why the observed outcome ranges from an operating gain, to a clearer profitability gain, to a mixed liquidity and impairment result. Capability value can therefore appear in different indicators and at different times.

The integrated interpretation also clarifies the contribution of the three-question structure. The dimensions are complementary rather than simply additive. Information integration can improve the quality of a decision, but financial value still depends on how resources are committed and on whether later credit, financing, and liquidity pressures are controlled. Conversely, favorable financing indicators cannot compensate automatically for weak operating conversion or rising impairment. Treating MACC as a connected capability bundle is therefore more consistent with the systems-and-packages literature than reducing it to one composite score (Malmi & Brown, 2008; Grabner & Moers, 2013; Gerdin, 2020; Merchant & Otley, 2020). The study's theoretical contribution lies in showing where the capability-to-performance chain appears complete, partial, or offset by other financial outcomes.

#### 4.2.5 Cross-Dimension Comparison and Research Question Answers

Table 4.3 compares the strength and completeness of the evidence rather than the economic size of unlike indicators. Resource allocation and cost control ranks first because both WTG and international comparisons show revenue growing faster than cost and margins rising. Information integration and decision use shows clear operating evidence, although its service-profit conversion is incomplete. Working-capital and risk control remains mixed because better aging, borrowing, finance expense, and gearing coexist with higher loss recognition, tighter maturity concentration, and lower cash. The comparison is based on specificity, internal consistency, and the presence or absence of material offsetting evidence.

Research Question 1 concerns the information integration and decision use dimension. Evidence is favorable for operating efficiency but qualified for 2025 service profitability. Research Question 2 concerns the resource allocation and cost control dimension and receives the strongest support because WTG and international revenue-cost-margin patterns both show improved profitability. Research Question 3 concerns the working-capital and risk control dimension. Its association with financial performance is mixed because better aging and financing indicators coexist with higher impairment, tighter short-term maturity concentration, and lower cash. These answers remain limited by public disclosures, two-year event matching, the absence

of internal budgets or a counterfactual, and reporting-basis differences; they do not establish sole causation.

Table 4.3 Goldwind Evidence Matched to the Three MACC Dimensions

| MACC dimension | Goldwind event or decision | Financial manifestation | Assessment |
|---|---|---|---|
| Information integration and decision use | Predictive maintenance and digital operating decisions | Unplanned downtime >40% lower; client O&M cost -25%; service revenue +3.79%, service cost +5.29%, gross profit about -1.71%, and margin 21.50% to 20.36% (-1.14 pp) | Operating efficiency improved, but 2025 service-profit conversion was not confirmed |
| Resource allocation and cost control | Larger-turbine product mix and international-market allocation | WTG revenue +46.98%, cost +40.94%, gross profit about +160.56%, and margin about 5.05% to 8.95% (+3.90 pp); international revenue +50.59%, cost +32.32%, and margin 13.84% to 24.29% (+10.45 pp) | Strongest observable evidence; market demand and timing remain additional explanations |
| Working-capital and risk control | Receivable, impairment, financing, and maturity management | >1-year receivable share 42.90% to 40.10%; allowance +13.73%; impairment +16.37% and reduced attributable profit by RMB966.74 million; borrowings -7.57%; net finance expense -20.13%; gearing -1.93 pp; <1-year debt share 55.58% to 57.55% | Aging and financing improved, but impairment, maturity concentration, and lower cash produced mixed evidence |

# Chapter 5 Conclusion and Recommendation

## 5.1 Conclusion

### 5.1.1 Overall Conclusion and Evidence Basis

The study examined how each of the three MACC dimensions—the information integration and decision use dimension, the resource allocation and cost control dimension, and the working-capital and risk control dimension—was associated with Goldwind's financial performance. It also developed recommendations for decision review, resource and cost management, cash-flow quality, and financial resilience.

Document analysis was used as the research method, while the literature review served as the research process. Forty non-company sources published from 1980 to 2025 were organized through the Resource-Based View, Management Control Systems Theory, and Contingency Theory. An analytical matrix was used as the research instrument to match each MACC dimension with Goldwind's disclosed actions and 2024–2025 financial indicators, using official reports and announcements as company evidence.

The results differed across the three dimensions. The information integration and decision use dimension was clearer in operating efficiency than in service profitability. The resource allocation and cost control dimension produced the clearest financial pattern through product and international profitability. The working-capital and risk control dimension improved selected credit-aging and financing indicators, but impairment and short-term maturity pressure remained.

Across the three questions, the evidence does not support a single claim that MACC uniformly improves every aspect of financial performance. Instead, the results show different stages of financial conversion. The first dimension demonstrates operating value without a confirmed service-margin gain; the second shows the clearest conversion from resource commitment to profitability; and the third shows that financing improvements can coexist with loss recognition and liquidity pressure. This pattern reinforces the study's central argument that financial performance should be evaluated through linked outcomes rather than through one headline indicator.

The conclusions remain bounded by the available evidence. Detailed matching relies mainly on 2024–2025 public disclosures, while the 2021–2025 series shows only broader direction. Internal budgets, forecasts, management meeting records, project-level decision logs, and a formal counterfactual were unavailable. Because some disclosures use different reporting levels or accounting bases, comparisons were made only within consistent source tables. These limits reduce causal certainty but still allow the framework to trace whether theory, disclosed action, and observed financial movement are mutually consistent.

### 5.1.2 Conclusion on Information Integration and Decision Use

For the first research question, the evidence points to operating value but incomplete financial conversion. Predictive maintenance reduced unplanned

downtime by more than 40%, and cross-regional optimization reduced clients' operation-and-maintenance costs by 25%. Wind Power Services revenue increased 3.79%, yet cost increased 5.29%, gross profit decreased about 1.71%, and margin declined 1.14 percentage points. The information integration and decision use dimension was therefore associated with improved observable operating performance without a corresponding 2025 improvement in service profitability.

### 5.1.3 Conclusion on Resource Allocation and Cost Control

The second research question receives the strongest support. The larger-turbine allocation was accompanied by WTG revenue growth of 46.98%, cost growth of 40.94%, gross-profit growth of about 160.56%, and a 3.90-percentage-point margin increase, from about 5.05% to 8.95%. International revenue rose 50.59% while cost rose 32.32%, increasing international margin by 10.45 percentage points. Because revenue, cost, gross profit, and margin moved favorably within the same product and regional categories, the resource allocation and cost control dimension showed the strongest observable association with Goldwind's financial performance among the three dimensions.

### 5.1.4 Conclusion on Working-Capital and Risk Control

The third research question remains mixed. Receivables older than one year fell by 2.80 percentage points, borrowings declined 7.57%, net finance expense declined 20.13%, and gearing declined 1.93 percentage points. At the same time, the loss allowance increased 13.73%, impairment increased 16.37%, the share of debt due within one year rose 1.97 percentage points, and year-end cash fell about 14.57%. The working-capital and risk control dimension was therefore associated with better selected exposure and financing outcomes, but credit-loss recognition and short-term liquidity continued to constrain the overall result.

## 5.2 Recommendation

### 5.2.1 Recommendation for Information Integration and Decision Use

Goldwind should review major digital operating decisions against both operating efficiency and service profitability. Downtime and client operation-and-maintenance cost should be read together with Wind Power Services revenue, cost, gross profit, and margin. When efficiency improves but service margin weakens or fails to follow, a follow-up review of contract mix and the main service-cost drivers should be triggered before the digital initiative is treated as a completed financial success.

### 5.2.2 Recommendation for Resource Allocation and Cost Control

Product and market allocation should be reviewed through the same revenue-cost-profit sequence used in this study. Major turbine-mix and international-market commitments should be followed by category-level checks of revenue growth, cost growth, gross profit, and margin. If revenue no longer grows faster than cost or margin begins to narrow, product mix, project timing, geographic allocation, and the

related resource commitment should be reconsidered before additional capacity or market resources are committed.

### 5.2.3 Recommendation for Working-Capital and Risk Control

Receivables, impairment, financing, and maturities should be reviewed together rather than as separate improvements. Receivable aging and loss allowances should be considered alongside impairment's effect on profit, while borrowings and net finance expense should be read alongside debt due within one year and available cash. If financing cost falls while impairment, maturity concentration, or cash pressure worsens, the financing improvement should be treated as incomplete and followed by a joint review of credit exposure and short-term liquidity.

## 5.3 Further Study

### 5.3.1 Cross-Company and Longer-Period Research

Further research may apply the same three-dimension framework to other new-energy equipment manufacturers and compare companies with different sizes, technologies, markets, and international exposure. A longer reporting period could test whether the observable association of each dimension appears immediately or with a lag. Where sufficiently consistent data are available, longitudinal or event-based designs could also compare periods before and after major control-related changes and provide stronger evidence on timing and alternative explanations.

Comparative research should preserve the same three-question structure while allowing company-specific indicators where reporting systems differ. Keeping the conceptual definitions stable would make it possible to compare whether information use, resource allocation, and working-capital and risk control show similar patterns across firms. A longer panel could also examine lagged relationships, because an operating improvement, a resource commitment, or a risk response may not appear in profitability or liquidity in the same reporting period. This would help separate company-specific conditions from mechanisms that recur across new-energy equipment manufacturers.

### 5.3.2 Use of Internal Management Evidence

Future studies could incorporate internal decision records, budget revisions, project reviews, and other company evidence when access is available. Researchers should retain consistent dimension and indicator definitions so that the timing and relative strength of the three relationships may be compared across companies and periods.

Internal management evidence could also strengthen the link between a disclosed action and the financial movement that follows it. Budget revisions, forecast updates, variance reports, project-review records, receivable-aging reviews, financing decisions, and management meeting materials could show when a decision was made, what alternatives were considered, and how managers responded to deviations. Combining these records with public financial statements would not remove all causal

limitations, but it would improve the timing and mechanism evidence behind each of the three research questions and allow the literature-based framework to be tested more rigorously.

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# Appendix A Literature Concept Matrix

Table A.1 Theoretical and Management Control Sources

| Source | Main contribution used | Alignment |
|---|---|---|
| Otley (1980) | Establishes contingency-based management accounting logic | All dimensions: context |
| Barney (1991) | Defines valuable and difficult-to-imitate resources and capabilities | Capability logic |
| Kaplan and Norton (1992) | Broadens performance measurement and strategic attention | Objective 1 and outcomes |
| Simons (1995) | Distinguishes diagnostic and interactive control use | Objectives 1-3 |
| Otley (1999) | Links objectives, targets, evaluation, rewards, and information | Objectives 1 and 2 |
| Chenhall (2003) | Synthesizes organizational contingencies of control design | All dimensions: context |
| Henri (2006) | Connects management control, strategy, and resource-based capability | Capability and Objective 1 |
| Anthony and Govindarajan (2007) | Explains planning, responsibility, and management control processes | Objective 2 |
| Malmi and Brown (2008) | Frames management controls as a package | MACC definition |
| Grabner and Moers (2013) | Distinguishes control systems from control packages | MACC definition |
| Otley (2016) | Updates contingency theory and research boundaries | All dimensions: context |
| Bedford et al. (2016) | Shows strategy-dependent effectiveness of control configurations | Objective 2 and context |
| Merchant and Van der Stede (2017) | Explains results, action, personnel, and cultural controls | Objectives 1-3 |
| Bedford (2020) | Clarifies conceptual issues in control combinations | MACC definition |
| Gerdin (2020) | Develops system and complementarity thinking | MACC definition |
| Merchant and Otley (2020) | Advances the systems-versus-package discussion | MACC definition |
| van der Kolk et al. (2020) | Shows tensions created by control combinations | Objective 2 and boundaries |

Table A.2 Information, Capability, Performance, and Review Sources

| Source | Main contribution used | Alignment |
|---|---|---|
| Ittner and Larcker (2001) | Cautions against untested cause-and-effect assumptions | Objective 1 and validity |
| Torraco (2005) | Provides guidance for integrative reviews | Method |
| Teece (2007) | Explains sensing, seizing, and transformation | Capability and adaptation |
| Snyder (2019) | Positions literature review as a research methodology | Method |
| Mikalef et al. (2020) | Connects analytics with operational capabilities and performance | Objective 1 |
| Möller et al. (2020) | Updates digitalization in management accounting and control | Objective 1 |
| Mikalef and Gupta (2021) | Treats digital technology through a capability lens | Objective 1 |
| Nudurupati et al. (2021) | Shows adaptation of performance management to changing environments | Objective 2 and context |
| Kraus et al. (2022) | Provides guidelines for literature reviews as independent studies | Method |
| Fähndrich (2023) | Reviews digitalization effects on management control | Objective 1 |
| Sauer and Seuring (2023) | Provides transparent review decisions and steps | Method |
| Bedford et al. (2025) | Links automation and analytics with finance-function effectiveness | Objective 1 |
| Dirks and Wouters (2025) | Examines performance measurement in dynamic environments | Context |
| Schilke et al. (2018) | Reviews dynamic-capability concepts and boundaries | Capability and adaptation |
| Webster and Watson (2002) | Establishes concept-centric literature synthesis | Method |

Table A.3 Working-Capital, Risk, Resilience, and Institutional Sources

| Source | Main contribution used | Alignment |
|---|---|---|
| Deloof (2003) | Relates working-capital measures to profitability | Objectives 2 and 3 |
| COSO (2013) | Links objectives, risk, control activities, information, and monitoring | Objective 3 |
| Ministry of Finance of the PRC (2016) | Defines management accounting planning, decision, control, and evaluation roles | Institutional context |
| Anton and Nucu (2020) | Reviews enterprise risk management and research directions | Objective 3 |
| Boisjoly et al. (2020) | Examines financial and valuation effects of working capital | Objectives 2 and 3 |
| Roffia and Dabić (2024) | Links integrated information and control with resilience | Objective 3 |
| Kiymaz et al. (2024) | Compares working-capital and performance across economies | Objectives 2 and 3 |
| Weber et al. (2024) | Synthesizes resilience-oriented management control systems | Objective 3 |

*Note: The 40-source corpus contains 17 sources in Table A.1, 15 in Table A.2, and 8 in Table A.3. Company documents are excluded and listed separately in Appendix B.*

# Appendix B Goldwind Validation Data

Table B.1 Indicator Definitions

| MACC dimension | Core indicators retained | Analytical use |
|---|---|---|
| Information integration and decision use | Unplanned downtime; client O&M cost; Wind Power Services revenue, cost, gross profit, and margin | Assesses whether digital operating efficiency is accompanied by stronger service profitability |
| Resource allocation and cost control | WTG and international revenue, cost, gross profit, and margin | Assesses whether product and market allocation is accompanied by stronger profitability in the same categories |
| Working-capital and risk control | Receivable aging and loss allowance; impairment effect; borrowings, net finance expense, gearing, and short-term debt share | Assesses whether exposure and financing improvements outweigh profit and liquidity pressure |

Table B.2 Goldwind Official Financial Data, 2021–2025

| Year | Revenue | Attributable profit | Cash and cash equivalents | Total assets | Total liabilities |
|---|---|---|---|---|---|
| 2021 | 507.46 | 37.31 | 81.41 | 1,196.65 | 829.37 |
| 2022 | 462.54 | 23.83 | 152.46 | 1,368.22 | 964.76 |
| 2023 | 502.44 | 13.31 | 136.94 | 1,434.95 | 1,032.66 |
| 2024 | 565.16 | 18.60 | 111.33 | 1,552.24 | 1,147.97 |
| 2025 | 727.82 | 27.74 | 95.11 | 1,664.95 | 1,193.14 |

Note: Values are RMB 100 million from the consolidated IFRS highlights in Goldwind's 2025 Annual Report; 2021 revenue is restated. Event-level comparisons use one accounting basis throughout.

Table B.3 Official Goldwind Sources and Analytical Roles

| Official source | Main evidence used | Role and limitation |
|---|---|---|
| About Goldwind webpage | Company activities and integrated wind-power solutions | Introduces the company; not used as financial proof |
| Goldwind 2025 Annual Report and audited statements | 2021–2025 highlights and 2024–2025 segment, regional, receivable, financing, and maturity data | Audited values control each same-basis financial comparison |
| Goldwind 2025 Sustainability Report | Predictive maintenance and operating-efficiency outcomes | Provides operating evidence; segment results are taken from the annual report |
| Goldwind 2024 and 2025 impairment announcements | Credit and asset impairment amounts and effects on attributable profit | Shows risk recognition and reported-profit effect; not a cash-payment measure |