

# case study

## Bridging the Strategy-Execution Gap: CMMI as the Engine for Strategic Success

In today's volatile and complex mining environment, Andes Copper Corporation must bridge the gap between strategic vision and operational execution. This document outlines a strategic scenario where the Capability Maturity Model Integration (CMMI) framework serves as a key enabler to achieve organizational goals.



### Objectives

Andes Copper Corporation aims to boost profitability through cost optimization and scaling, while ensuring reliable, high-quality copper supply to global markets. It also focuses on sustainability, innovation, workforce development, and stakeholder engagement.



### Solutions

It leverages the CMMI framework to boost efficiency, mitigate environmental and social risks, and modernize through automation and analytics which aligns strategy with execution for global competitiveness.

Pieter van Zyl, 27 April 2025

## Executive Summary

In today's volatile and complex mining environment, Andes Copper Corporation must bridge the gap between strategic vision and operational execution. This document outlines a strategic scenario where the Capability Maturity Model Integration (CMMI) framework serves as a key enabler to achieve organizational goals.

Using fictitious but realistic strategic findings, we have mapped Andes Copper's business challenges, opportunities, and transformation initiatives directly to relevant CMMI Capability Areas. This ensures that every key strategic objective is underpinned by recognized best practices, scalable frameworks, and operational discipline.

The approach demonstrates how structured capability management, process maturity, and performance measurement can empower Andes Copper to:

- Strengthen operational efficiency
- Manage environmental and social risks
- Foster innovation and modernization
- Enhance stakeholder trust
- Secure competitive advantage in global markets

This alignment between strategy and capability building provides Andes Copper with a sustainable roadmap for transformation, resilience, and future growth.

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# 1. Introduction

This scenario study makes use of the Demixium™ framework, designed to support effective business transformation and facilitate the adoption of recognized industry best practices.

## 1.1 The Andes Copper Corporation

Location: High in the Andes Mountains, Chile

Type: Large-scale open-pit mine

Operations:

- Exploration and drilling to define ore reserves
- Blasting, excavation, and hauling of ore
- Crushing and grinding of ore
- Flotation to separate copper concentrate
- Smelting of concentrate to produce copper anodes
- Refining of anodes to produce high-grade copper cathodes
- Logistics: Transport of cathodes to port, shipping to global markets

## 2. Company Objectives (Strategic Goals)

- Increase profitability through cost optimization and operational scaling.
- Ensure reliable and high-quality supply to global markets.
- Expand revenue streams through new copper applications.
- Optimize internal operations for efficiency and sustainability.
- Develop an innovative, tech-savvy workforce.
- Maintain strong stakeholder and community relations.
- Drive continuous process and performance improvement using best practices like CMMI.

## 3. Company Challenges (Strategic Issues)

- High operating costs
- Water scarcity risk
- Environmental and social impact
- Aging infrastructure
- Market price volatility
- Political/regulatory instability
- Need for technological modernization
- Inconsistent process maturity across operations



## 4. Strategic Planning and CMMI Support

### 4.1 SWOT Analysis for Andes Copper Corporation



#### Strengths

During strategic planning, Andes Copper Corporation identified the urgent need to improve technical process design and efficient material handling to maximize ore yield.

- **Capability Area: EDP (Engineering & Developing Products)**
  - CMMI Alignment: TS - Technical Solution (Efficient extraction design), PI - Product Integration (Optimized material flow).

Recognizing that talent retention and upskilling are crucial to supporting technical innovations, the company focused on strengthening workforce capability development.

- **Capability Area: MWF (Managing the Workforce)**
  - CMMI Alignment: WE - Workforce Empowerment (Skills management), OT - Organizational Training (Ongoing development).

Management concluded that ongoing operational efficiency requires robust infrastructure and standardized processes to reduce maintenance disruptions.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: II - Implementation Infrastructure (Maintenance and optimization), PCM - Process Management (Efficient operations).

Realizing the need for reliable delivery to clients to protect reputation and revenue, logistics optimization emerged as a strategic focus.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: SDM - Service Delivery Management (Reliable delivery), PLAN - Planning (Logistics planning).

## Weaknesses

Strategic discussions highlighted that controlling high operational costs must be addressed through better financial measurement and process control mechanisms.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: MPM - Managing Performance and Measurement (Cost analysis), PCM - Process Management (Cost optimization).

Water scarcity risks prompted a reassessment of resource planning and contingency development to protect production continuity.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: RSK - Risk and Opportunity Management (Water risk mitigation), PLAN - Planning (Resource planning).

Facing scrutiny from regulators and communities, Andes Copper emphasized improving environmental compliance and social impact transparency.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Environmental compliance), PQA - Process Quality Assurance (Environmental monitoring).

Aging infrastructure prompted a drive to develop sustainable lifecycle renewal plans and configuration management standards.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: PAD - Process Asset Development (Infrastructure renewal), CM - Configuration Management (Equipment maintenance).

## Opportunities

Anticipating surging copper demand in electric vehicles and renewable energy, Andes Copper identified the need for scalable production and dynamic market targeting.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: STSM - Strategic Service Management (Market analysis), PLAN - Planning (Production scaling).

Strategic modernization initiatives identified automation and big data analytics as transformational levers for efficiency gains.

- **Capability Area: EDP (Engineering & Developing Products)**
  - CMMI Alignment: TS - Technical Solution (Automation design), DM - Data Management (Analytics infrastructure).

Exploration potential in nearby mineral-rich zones necessitated careful risk-based investment and project expansion planning.

- **Capability Area: PMW (Planning & Managing Work)**
  - CMMI Alignment: PLAN - Planning (Exploration projects), RSK - Risk and Opportunity Management (Investment analysis).

To capture additional revenue streams, the company considered strategic product diversification into copper by-products.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: STSM - Strategic Service Management (New product planning), PCM - Process Management (Production process changes).

## Threats

To hedge against unpredictable copper market fluctuations, Andes Copper aimed to develop risk-based financial models and flexible production scenarios.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: RSK - Risk and Opportunity Management (Financial risk management), MPM - Managing Performance and Measurement (Financial forecasting).

In light of political risk and regulatory change in Chile, governance and long-term planning capabilities were prioritized.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Regulatory compliance), PLAN - Planning (Long-term strategic planning).

Community relations posed a potential threat to operational stability, requiring structured engagement and assurance programs.

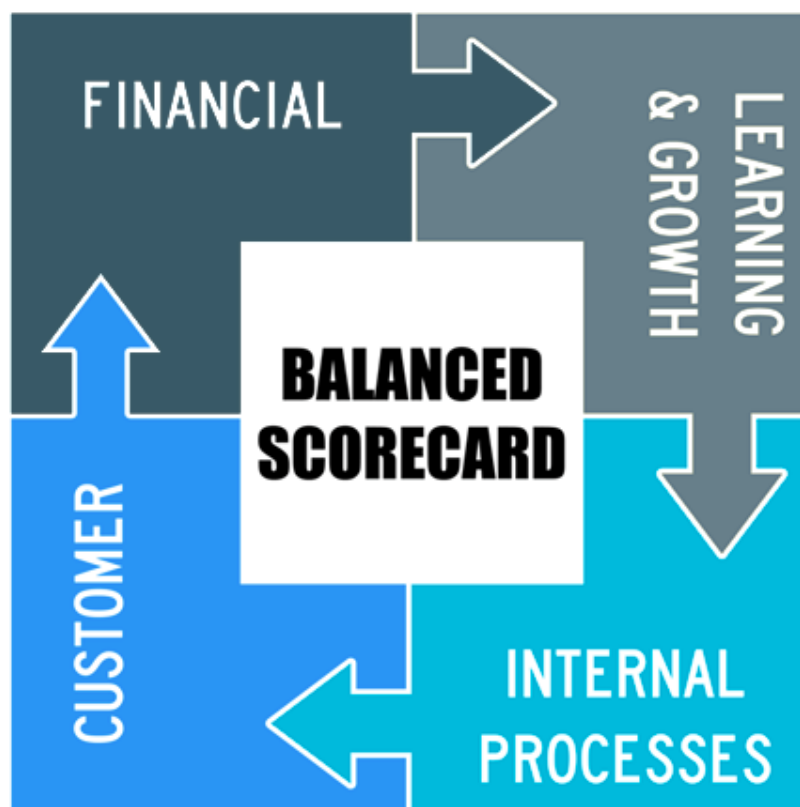
- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Community engagement), PQA - Process Quality Assurance (Social impact assessment).

Climate change risks, including extreme weather, necessitated robust operational resilience and disaster recovery frameworks.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: CONT - Continuity (Disaster recovery), RSK - Risk and Opportunity Management (Climate risk assessment).

## 4.2 Balanced Scorecard for Andes Copper Corporation

To align strategic goals with operational execution, Andes Copper applied the Balanced Scorecard approach, identifying key perspectives and mapping them to CMMI Capability Areas for execution support.



### Financial Perspective

Recognizing that optimizing production costs and maximizing returns is vital to profitability, Andes Copper reinforced financial planning and risk mitigation frameworks.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: MPM - Managing Performance and Measurement (Cost control and ROI optimization), PLAN - Planning (Strategic financial planning).

To enhance resilience against market fluctuations and cost volatility, risk-based financial modeling became a strategic necessity.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: RSK - Risk and Opportunity Management (Financial risk assessments).

## Customer Perspective

Andes Copper concluded that maintaining product quality and delivering reliable services are fundamental to customer loyalty and competitive advantage.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: SDM - Service Delivery Management (Reliable order fulfillment).

The strategic review highlighted the importance of exceeding customer quality expectations through process-driven product assurance.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: PQA - Process Quality Assurance (Product conformance monitoring).

Market intelligence and service strategy refinement were identified as growth enablers in an increasingly globalized customer base.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: STSM - Strategic Service Management (Customer needs analysis, value proposition development).

## Internal Processes Perspective

A major focus during strategic planning was ensuring streamlined, safe, and sustainable operational processes across all mining stages.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: PCM - Process Management (Operational workflow optimization).

Asset reliability and infrastructure sustainability were recognized as pivotal to process consistency and safety.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: II - Implementation Infrastructure (Asset maintenance and lifecycle management).

Continuity planning emerged as essential to protect critical mining operations from disruptions.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: CONT - Continuity (Operational resilience and recovery planning).



## Learning and Growth Perspective

Andes Copper's leadership team determined that long-term success hinges on building a skilled, empowered, and adaptive workforce.

- **Capability Area: MWF (Managing the Workforce)**
  - CMMI Alignment: OT - Organizational Training (Upskilling and technical education), WE - Workforce Empowerment (Empowering innovation).

Organizational governance structures were reinforced to embed a culture of ethical leadership, compliance, and strategic clarity.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Leadership accountability and alignment).

## 4.3 Business Model Canvas for Andes Copper Corporation



Andes Copper adapted its business model canvas to integrate CMMI Capability Areas directly into strategic components.

### Customer Segments

Understanding that global industrial sectors (e.g., EV, renewable energy) demand reliability and quality, Andes Copper focused market strategy refinement.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: STSM - Strategic Service Management (Customer segmentation and trend analysis).

## Value Propositions

Strategic workshops concluded that Andes Copper's value must be firmly anchored in consistent quality and reliability of supply.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: RDM - Requirements Development and Management (Product value definition), PQA - Process Quality Assurance (Deliverable quality).

## Channels

Logistical efficiency and real-time supply chain visibility were prioritized during operational reviews.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: SDM - Service Delivery Management (Supply chain performance management), PLAN - Planning (Distribution network optimization).

## Customer Relationships

Building deeper, trust-based customer engagement frameworks became a key output from strategic relationship reviews.

- **Capability Area: DMS (Delivering & Managing Services)**
  - CMMI Alignment: SDM - Service Delivery Management (Customer service operations), GOV - Governance (Ethical engagement practices).

## Revenue Streams

Increased emphasis was placed on data-driven optimization of pricing models and diversification of revenue sources.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: MPM - Managing Performance and Measurement (Revenue analysis and pricing optimization).

## Key Activities

Innovation in extraction and refining methods, operational safety, and continuous improvement were identified as critical success activities.

- **Capability Area: EDP (Engineering & Developing Products)**
  - CMMI Alignment: TS - Technical Solution (Innovation in processes), PCM - Process Management (Process standardization).

## Key Resources

Andes Copper reinforced that human capital, technical infrastructure, and ore reserves are strategic pillars requiring careful stewardship.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: II - Implementation Infrastructure (Resource management), CM - Configuration Management (Asset tracking and control).

## Key Partnerships

Supplier quality management and strategic alliances were deemed critical to risk mitigation and sustainable supply chain resilience.

- **Capability Area: SMS (Selecting & Managing Suppliers)**
  - CMMI Alignment: SAM - Supplier Agreement Management (Partnership governance).

## Cost Structure

Financial modeling revealed the importance of maintaining tight control over operational expenditures while supporting innovation investments.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: MPM - Managing Performance and Measurement (Cost management analysis), PCM - Process Management (Operational efficiency improvements).

## 4.4 Value Chain Mapping for Andes Copper Corporation

During strategic planning, Andes Copper Corporation mapped its key value chain activities to appropriate CMMI Capability Areas to ensure alignment with strategic objectives.



### Primary Activities

#### ***Inbound Logistics***

Andes Copper recognized that consistent and efficient raw material handling processes are critical to operational flow.

- ***Capability Area: DMS (Delivering & Managing Services)***
  - CMMI Alignment: SDM - Service Delivery Management (Material handling), PLAN - Planning (Receiving and warehousing).

#### ***Operations***

Strategic analysis highlighted that operational excellence must be anchored in process standardization, continuous improvement, and safety innovation.

- ***Capability Area: IMP (Improving Performance)***
  - CMMI Alignment: PCM - Process Management (Process standardization), II - Implementation Infrastructure (Operational support infrastructure).

## ***Outbound Logistics***

Customer satisfaction reviews revealed that delivery reliability must be enhanced through integrated outbound logistics planning.

- ***Capability Area: DMS (Delivering & Managing Services)***
  - CMMI Alignment: SDM - Service Delivery Management (Shipment tracking and management).

## ***Marketing and Sales***

The market positioning review emphasized the need for data-driven segmentation and dynamic value proposition messaging.

- ***Capability Area: DMS (Delivering & Managing Services)***
  - CMMI Alignment: STSM - Strategic Service Management (Customer targeting), PLAN - Planning (Marketing resource planning).

## ***Service (After-Sales Support)***

Customer service strategy revisions highlighted that robust support mechanisms strengthen brand loyalty and repeat business.

- ***Capability Area: DMS (Delivering & Managing Services)***
  - CMMI Alignment: SDM - Service Delivery Management (Customer service processes).

## **Support Activities**

### ***Firm Infrastructure***

Andes Copper emphasized the need for integrated, scalable governance and compliance systems supporting operational transparency.

- ***Capability Area: ENQ (Ensuring Quality)***
  - CMMI Alignment: GOV - Governance (Corporate governance, compliance systems).

### ***Human Resource Management***

Leadership concluded that organizational success requires a motivated, agile, and future-ready workforce.

- ***Capability Area: MWF (Managing the Workforce)***
  - CMMI Alignment: OT - Organizational Training (Skills training programs), WE - Workforce Empowerment (Empowerment and engagement).



## **Technology Development**

Strategic workshops reinforced that investment in mining technology innovation is critical for cost control and competitive edge.

- **Capability Area: EDP (Engineering & Developing Products)**
  - CMMI Alignment: TS - Technical Solution (Technology upgrades and integration).

## **Procurement**

Risk mitigation reviews led Andes Copper to prioritize strategic supplier management and diversification initiatives.

- **Capability Area: SMS (Selecting & Managing Suppliers)**
  - CMMI Alignment: SAM - Supplier Agreement Management (Procurement governance).

## **4.5 Strategic Execution Mapping: Challenges to CMMI Capability Areas**

To effectively bridge strategic challenges to operational execution, Andes Copper mapped key organizational challenges to corresponding CMMI Capability Areas.

### **Challenge: High Operating Costs**

During internal assessments, the management team concluded that cost drivers must be attacked systematically through measurement and process efficiency initiatives.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: MPM - Managing Performance and Measurement (Cost tracking), PCM - Process Management (Efficiency gains).

### **Challenge: Water Scarcity**

Environmental scenario planning emphasized that sustainable water management must become an integrated operational priority.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: RSK - Risk and Opportunity Management (Water risk strategies), CONT - Continuity (Water supply continuity).

### **Challenge: Environmental and Social Impact**

Stakeholder engagement analysis underscored that stronger governance practices were vital to improving social license to operate.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Community engagement strategies), PQA - Process Quality Assurance (Environmental monitoring).

### Challenge: Aging Infrastructure

Maintenance risk assessments revealed that operational resilience depends on structured asset renewal and configuration management.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: PAD - Process Asset Development (Asset lifecycle planning), CM - Configuration Management (Infrastructure tracking).

### Challenge: Market Uncertainty and Price Volatility

The need for predictive financial models and adaptive production strategies became clear during financial stress testing exercises.

- **Capability Area: MBR (Managing Business Resilience)**
  - CMMI Alignment: RSK - Risk and Opportunity Management (Financial scenario modeling).

### Challenge: Political and Regulatory Risk

Scenario planning indicated that governance mechanisms must be strengthened to adapt quickly to external regulatory changes.

- **Capability Area: ENQ (Ensuring Quality)**
  - CMMI Alignment: GOV - Governance (Compliance agility), PLAN - Planning (Regulatory planning).

### Challenge: Need for Technological Modernization

Innovation workshops showed that the competitive advantage depends on accelerated adoption of automation and data technologies.

- **Capability Area: EDP (Engineering & Developing Products)**
  - CMMI Alignment: TS - Technical Solution (Automation integration), DM - Data Management (Analytics capabilities).

### Challenge: Process Maturity Gaps

Appraisal readiness assessments revealed that fragmented process discipline must be addressed through sustained process optimization efforts.

- **Capability Area: IMP (Improving Performance)**
  - CMMI Alignment: PCM - Process Management (Process improvement cycles), MPM - Managing Performance and Measurement (Performance monitoring).

## 5. Conclusion

Andes Copper Corporation's strategic transformation journey leverages the CMMI model as a structured and scalable engine for delivering business value, driving operational excellence, ensuring sustainability, and mitigating enterprise risks. The mapping of Capability Areas to strategic initiatives enables a direct and measurable bridge between strategy and operational execution.