FROM COMPETITION TO COLLABORATION: ACTIVITY-BASED COOPETITION IN PLASTICS AND COMPOSITES SMEs

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Abstract - Small and medium-sized enterprises (SMEs) in the plastics and composites industry face unprecedented challenges including resource constraints, global competition, and market volatility. This research introduces an innovative activity-based coopetition framework that enables SMEs to selectively collaborate with competitors on specific business functions while maintaining competitive advantages in core areas. Through an empirical study of Alliance Polymères Québec (APQ) member firms, we develop a novel Collaborative Activity Positioning Matrix (CAPM) that maps collaboration suitability across business functions based on customer proximity and strategic sensitivity. Our findings reveal a clear activity hierarchy where SMEs demonstrate high willingness to collaborate in support functions (75% logistics, 77.8% competitive intelligence) while protecting customer-facing operations. We introduce the concept of "coopetition corridors"—strategic spaces where collaboration creates mutual value without compromising competitive positions. The study contributes a practical implementation roadmap and governance framework for activity-based coopetition in manufacturing SMEs.

Keywords - Activity-Based Coopetition, SMEs, Plastics Industry, Collaborative Positioning, Strategic Alliances, Coopetition Governance.

I. INTRODUCTION

The transition from pure competition to strategic collaboration represents a fundamental shift in how small and medium-sized enterprises (SMEs) navigate complex market environments. In the plastics and composites industry, this transformation has become not merely advantageous but essential for survival and growth [1]. The Quebec plastics cluster, anchored by Alliance Polymères Québec (APQ), exemplifies this evolution where traditional competitors increasingly recognize that collaboration can unlock value creation opportunities impossible through individual efforts alone.

This industry generates over CAD 1 billion annually in the Chaudière-Appalaches region, yet faces mounting pressures from global competition, technological disruption, and resource scarcity [2]. The sector's fragmentation—where 78% of firms generate only 20% of total volume—highlights the imperative for innovative collaborative strategies that leverage collective strengths while preserving individual competitive advantages.

Activity-based coopetition emerges as an appropriate response to these challenges, enabling firms to disaggregate their value chains and selectively collaborate where mutual benefits exceed competitive risks [3]. Recent research emphasizes the need for sophisticated governance mechanisms in coopetition relationships, particularly in service-oriented industries [4]. Unlike traditional alliance models that operate at firm level, this approach recognizes that different business activities carry varying collaboration potential based on their proximity to competitive advantage sources.This research addresses three critical gaps in existing literature: (1) the lack of practical frameworks for identifying optimal collaboration activities, (2) limited understanding of governance mechanisms that sustain activity-based partnerships, and (3) insufficient empirical evidence from manufacturing SMEs in traditional industries. Specifically, our research objectives are: 1) develop an innovative framework for mapping collaboration suitability across business activities, 2) identify the antecedents and outcomes specific to activity-based coopetition in manufacturing SMEs, and 3) create practical implementation guidelines for managers and industry associations.

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1. From Firm-Level to Activity-Level Coopetition

Traditional coopetition research predominantly focuses on firm-level relationships, treating collaboration as binary choice between cooperation and competition [5][6]. This perspective overlooks the nuanced reality that modern enterprises operate across multiple value chain activities with potential for collaborations.

Activity-based coopetition represents a paradigm shift toward granular collaboration decisions [7]. This approach recognizes that firms can simultaneously cooperate in upstream activities (R&D, procurement) while competing intensively in downstream markets (sales, customer service). The theoretical foundation rests on resource-based view principles, where collaboration creates value through resource pooling and capability combination [8]. Professional service

firms demonstrate distinct coopetition-specific motivations including strategic market positioning, competitive learning exploitation, and creating controlled competitive environments [4].

2.2. The Customer Proximity Principle

Review of 142 coopetition studies reveals a consistent pattern: collaboration willingness inversely correlates with customer proximity [9]. Activities closer to end customers (sales, service, customer data) generate higher competitive sensitivity, while distant activities (logistics, compliance, technical standards) offer safer collaboration spaces.

This principle forms the foundation for our innovative Collaborative Activity Positioning Matrix (CAPM), which maps activities across two dimensions: (1) Customer Proximity (low to high) and (2) Strategic Sensitivity (low to high).

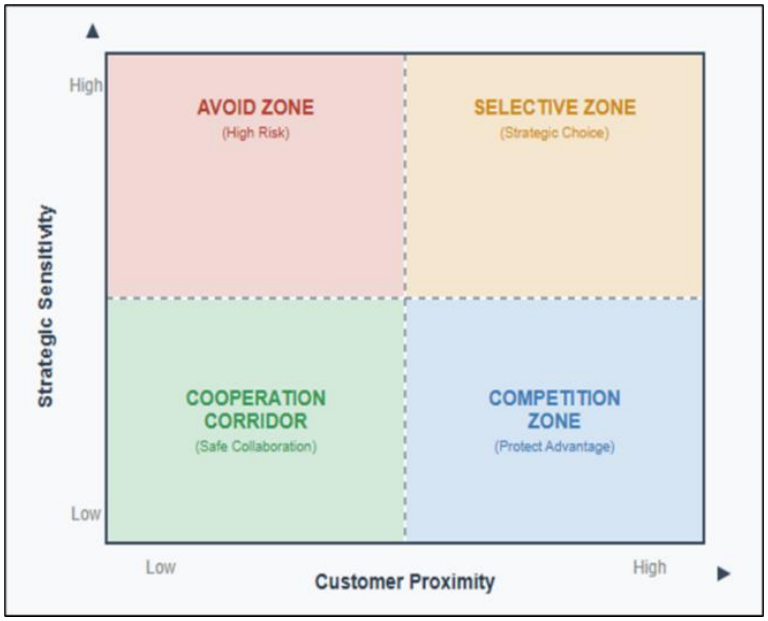

Figure 1 Collaborative Activity Positioning Matrix

2.3. Governance Mechanisms in Activity-Based Coopetition

Activity-based collaboration requires sophisticated governance mechanisms that differ from traditional alliance structures [10]. Contemporary studies reveal that activity-based collaboration requires multi-tier governance frameworks that address complexity at operational, relational, and network levels [4][11]. We identify three governance archetypes:

1. Formal Contractual Governance: Legal agreements specifying activity boundaries, resource contributions, and value distribution mechanisms.
2. Relational Governance: Trust-based arrangements leveraging repeated interactions and reputation effects.
3. Institutional Governance: Industry association-mediated collaboration using neutral third-party facilitation.

2.4. The Role of Intermediary Organizations

Professional associations emerge as critical enablers of activity-based coopetition through three mechanisms [12]:

- Trust Building: Creating safe spaces for competitor interaction.
- Information Sharing: Facilitating transparent communication channels.
- Conflict Resolution: Providing neutral mediation for disputes.

Recent research on service priorities emphasizes the importance of managing resource and capability constraints in turbulent environments [13].

III. METHODOLOGY

3.1. Research Design and Innovation

This study employs an innovative mixed-methods approach combining quantitative preference mapping with qualitative process exploration. Unlike traditional coopetition studies that focus on dyadic relationships, we examine network-level collaboration patterns within an established industry cluster.

3.2. The Alliance Polymères Québec Context

APQ represents suitable research setting for four reasons:

- Established cluster with 50+ member firms.
- Diverse size distribution enabling cross-firm analysis.
- Active interest in collaborative strategies.

- Geographic concentration facilitating data collection.
- 4 smaller firms pursuing larger partner collaboration.

3.3. Data Collection Innovation

We developed a "Collaboration Scenario Mapping" approach where participants evaluate collaboration willingness across 8 distinct business activities using contextualized scenarios. Each scenario presented specific collaboration arrangements with identified potential partners, ensuring realistic assessments.

Sample Characteristics and Analytical Framework

- 3 large firms considering collaboration with smaller partners.
- 1 medium firm targeting equal-size collaboration.

Analysis proceeded through three phases:

1. Activity Mapping: Quantitative assessment of collaboration preferences across business functions.
2. Antecedent Analysis: Qualitative exploration of motivation factors using the APRM (Antecedents-Process-Results-Moderators) framework. This framework examines the foundational conditions that drive coopetition formation, the processes that facilitate collaboration, the outcomes achieved, and the contextual factors that influence success.
3. Governance Assessment: Evaluation of required mechanisms for successful implementation.

IV. RESULTS AND ANALYSIS

4.1. The Activity Collaboration Hierarchy

Our analysis reveals a hierarchy of collaboration willingness across business activities. Table I presents the complete ranking with strategic implications.

Rank	Activity	Positive Willingness	Strategic Rationale
1	Emergency product supply	77.8%	Crisis mutual aid
2	Competitive intelligence	77.8%	Shared market monitoring
3	Shipping/import cost sharing	75.0%	Logistics efficiency
4	Product innovation (generic)	66.7%	Technology advancement
5	Technical expertise sharing	66.7%	Knowledge pooling
6	Information transmission	62.5%	Early warning systems
7	Sales activities	55.6%	Market expansion
8	Customer service	55.6%	Service enhancement
9	Warehousing cost sharing	44.4%	Infrastructure optimization
10	Customer information sharing	44.4%	Market intelligence
11	Problem-solving assistance	44.4%	Mutual support

Table I: Collaboration Willingness Hierarchy

4.2. The Coopetition Corridor Concept

Our analysis introduces the concept of "coopetition corridors"—strategic spaces where collaboration creates substantial mutual value without compromising competitive positions. This finding aligns with recent research on professional services coopetition, which identifies specific spaces where collaboration creates mutual value without compromising competitive positions [4].

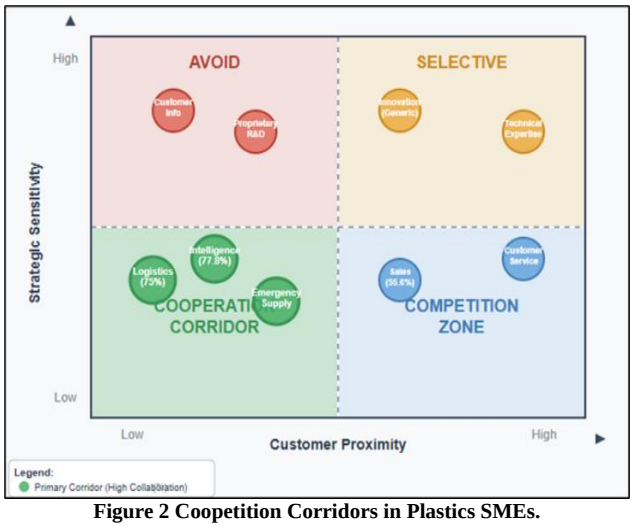

Figure 2 Coopetition Corridors in Plastics SMEs.

Key Findings:

- Primary Corridor: Logistics and competitive intelligence offer optimal collaboration potential.
- Secondary Corridor: Technical expertise and innovation provide selective opportunities.
- Protected Zones: Customer-facing activities remain competitive domains.

Component	Traditional Factors	APQ-Specific Innovations
Antecedents	Resource complementarity	Activity field complementarity
	Environmental uncertainty	Market size thresholds
	Strategic congruence	Intermediary organization strength
Process	Trust development	Activity-specific governance
	Information sharing	Boundary management protocols
Results	Performance improvement	Collaborative capability building
	Innovation enhancement	Network resilience
Moderators	Firm size	Collaboration experience
	Industry dynamics	Association mediation quality

Table II: Enhanced Antecedents-Process-Results-Moderators (APRM) Model for Activity-Based Coopetition

4.3. Antecedent Analysis: The APRM-Enhanced Model

Building on the traditional APRM (Antecedents-Process-Results-Moderators) framework—which systematically examines the preconditions that drive coopetition initiatives, the collaborative processes employed, the outcomes achieved, and the contextual factors that moderate success—we identify novel antecedents specific to activity-based coopetition. Table II presents our enhanced model that integrates traditional APRM components with APQ-specific innovations discovered through our empirical investigation.

4.4. Governance Framework Innovation

We develop a three-tier governance framework for activity-based coopetition, illustrated in the following figure:

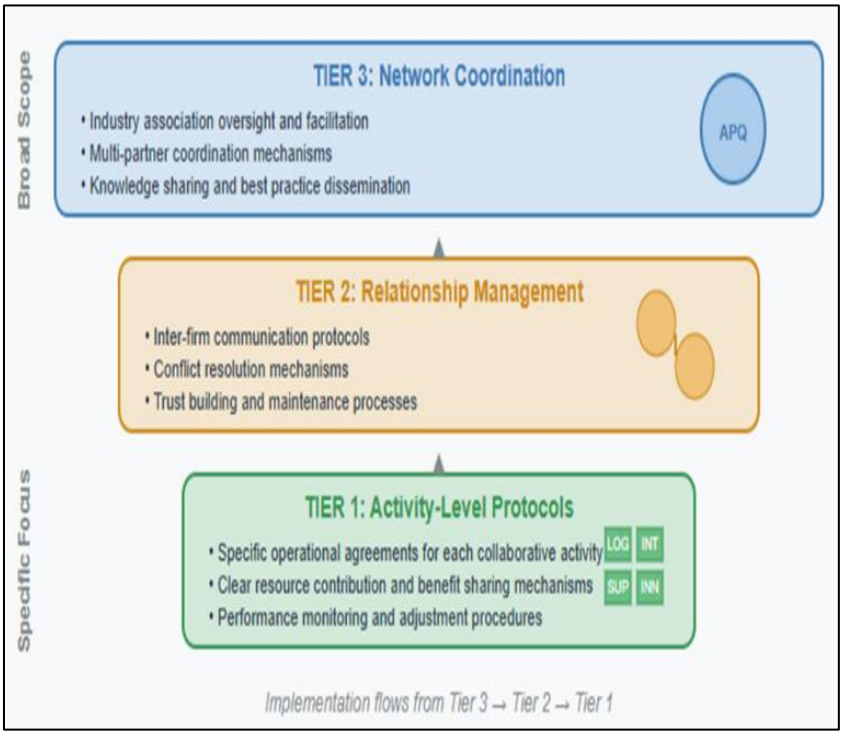

Figure 3: Three-Tier Governance Framework for Activity-Based Coopetition

Tier 1: Activity-Level Protocols

- Specific operational agreements for each collaborative activity.
- Clear resource contribution and benefit sharing mechanisms.
- Performance monitoring and adjustment procedures.

Tier 2: Relationship Management

- Inter-firm communication protocols.
- Conflict resolution mechanisms.
- Trust building and maintenance processes.

Tier 3: Network Coordination
- Industry association oversight and facilitation.
- Multi-partner coordination mechanisms.
- Knowledge sharing and best practice dissemination.

4.5. Implementation Readiness Assessment

Our analysis reveals varying readiness levels across different antecedent categories. Table III presents the assessment results.

Readiness Dimension	Score	Assessment	Required Actions
Individual Level	80.0 %	High	Maintain entrepreneurial orientation
Organizational Level	66.3 %	Moderate	Enhance resource mapping
Strategic Level	68.3 %	Moderate	Improve positioning clarity
Relational Level	32.9 %	Low	Intensive relationship building
Process Level	61.8 %	Moderate	Develop trust mechanisms

Table III: Implementation Readiness Assessment

V. CONCLUSION

This research demonstrates that the transition from competition to collaboration does not need to be an either-or choice. Through activity-based coopetition, manufacturing SMEs can pursue sophisticated strategies that leverage collective capabilities while protecting competitive advantages.

Our introduced model —the CAPM framework, coopetition corridors concept, and enhanced governance architecture—provide practical tools for managers navigating this complex terrain. The APQ case reveals that successful implementation requires careful activity selection, robust governance mechanisms, and strong intermediary organization support.

The findings suggest that activity-based coopetition represents a maturing strategic option for manufacturing SMEs, moving beyond experimental approaches toward systematic implementation. As competitive pressures intensify and resource constraints tighten, this collaborative sophistication may become essential for SME survival and growth.

5.1. Practical Implications

5.1.1. The CAPM Implementation Guide

We present a step-by-step implementation guide for managers divided on three phases:

Phase 1: Activity Assessment
1. Map all business activities across the CAPM framework.
2. Assess strategic sensitivity and customer proximity for each activity.
3. Identify activities falling within coopetition corridors.

Phase 2: Partner Evaluation
1. Conduct complementarity analysis for potential partners.
2. Evaluate relationship readiness using our assessment framework.
3. Select initial collaboration activities with the lowest risk profiles.

Phase 3: Governance Design
4. Implement tier-appropriate governance mechanisms.
5. Establish clear activity boundaries and performance metrics.
6. Create escalation and adjustment procedures.

5.1.2. Association-Level Innovations

For industry associations like APQ, we recommend three following innovations:

Innovation 1: Collaboration Facilitation Platform
- Digital tools for partner matching and activity coordination.
- Templates for activity-specific collaboration agreements.
- Performance monitoring and feedback systems.

Innovation 2: Relationship Building Programs
- Structured networking events focused on specific activity areas.
- Trust building workshops and conflict resolution training.
- Success story sharing and best practice dissemination.

Innovation 3: Governance Support Services
- Neutral mediation services for collaboration disputes.
- Legal framework guidance for activity-specific arrangements.
- Performance benchmarking and improvement consulting.

Our findings suggest several policy innovations:
- Tax incentives for documented collaboration activities.
- Simplified legal frameworks for activity-based partnerships.
- Public funding for association-mediated collaboration programs.

5.2. Theoretical Contributions and Future Research

5.2.1. Theoretical Innovations

This research contributes several theoretical innovations:

1. Activity-Based Coopetition Theory: Moving beyond firm-level analysis to granular activity-level collaboration decisions.
2. Coopetition Corridor Concept: Identifying optimal collaboration spaces within competitive relationships.
3. Enhanced APRM Framework: Integrating activity-specific factors into traditional coopetition models.
4. Governance Architecture: Multi-tier framework addressing the complexity of activity-based arrangements.

5.2.2. Future Research Directions

Research Priority 1: Longitudinal studies tracking coopetition corridor evolution.

Research Priority 2: Cross-industry validation of CAPM framework applicability.

Research Priority 3: Digital platform impact on activity-based collaboration.

Research Priority 4: Network-level effects of widespread activity-based coopetition.

Future research can explore the application of dynamic coopetition lifecycle models across different professional service contexts, as suggested by recent advances in coopetition theory [4]. Additionally, investigating legitimacy processes in collaborative service arrangements could provide valuable insights [14].

VII. LIMITATIONS AND CONSIDERATIONS

This exploratory study's small sample size (n=8) limits generalizability while providing rich insights for theory development. The findings represent initial validation of innovative concepts requiring broader empirical testing.

Methodological Limitations:

- Single industry focus may limit transferability.
- Self-reported collaboration willingness may differ from actual behavior.
- Cross-sectional design prevents causal inference.

Practical Limitations:

- Implementation requires significant relationship building investment.
- Governance complexity may challenge smaller organizations.
- Success depends on sustained commitment from multiple partners.

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