Inter-DAO Cooperation: Governance Dynamics in Multi-Organization Networks

Resource Sharing, Joint Proposals, and Cross-DAO Alignment

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Abstract

As the DAO ecosystem matures, organizations increasingly face challenges that transcend individual communities. Public goods funding, protocol interoperability, and ecosystem-wide standards require coordination across organizational boundaries. Yet inter-DAO cooperation mechanisms remain underdeveloped.

We investigate how cross-DAO collaboration affects governance outcomes using multi-agent simulation. Through 300 simulation runs across five cooperation scenarios, we examine joint proposal mechanisms, resource sharing arrangements, and cross-DAO voting coordination.

Our results reveal that inter-DAO cooperation can generate positive-sum outcomes when participating DAOs have complementary resource profiles. Homogeneous DAOs (similar size, preferences) achieve higher cooperation success rates but smaller gains. Heterogeneous configurations unlock larger benefits but face coordination challenges. Asymmetric relationships (large-small DAO pairings) require explicit fairness mechanisms to remain stable.

We identify conditions under which cooperation emerges naturally versus requiring explicit incentive design, and provide guidelines for inter-DAO proposal structures. Our findings inform the emerging practice of DAO-to-DAO relations and multi-organization governance.

Keywords: Inter-DAO Cooperation, Cross-Organization Governance, Resource Sharing, Multi-DAO Networks, Collaborative Decision-Making

1 Introduction

1.1 Motivation

DAOs do not exist in isolation. They operate within ecosystems of interdependent protocols, share user bases, and face common challenges. Public goods that benefit the entire ecosystem—infrastructure, standards, research—are under-provided when each DAO acts independently.

Inter-DAO cooperation has emerged organically:

- **Protocol collaborations**: Joint liquidity provision, shared security
- **Grants coordination**: DAOs co-funding public goods projects
- **Standard setting**: Multi-DAO governance over shared standards

- **Crisis response**: Coordinated action during security incidents

Yet formal mechanisms for inter-DAO cooperation remain primitive. Most cross-DAO interactions rely on informal relationships, multi-sig arrangements, or bilateral negotiations. The governance of multi-DAO initiatives is often ad hoc.

Understanding when and how DAOs can effectively cooperate—and what mechanisms enable coordination—is essential as the ecosystem moves toward greater interdependence.

1.2 Research Question

This paper investigates:

> **RQ5:** How does inter-DAO cooperation affect governance outcomes and resource efficiency?

Specifically, we examine:

1. Under what conditions do DAOs choose to cooperate on joint initiatives?
2. How do different cooperation structures (symmetric, asymmetric, hub-spoke) affect outcomes?
3. What mechanisms enable stable cooperation despite divergent preferences?
4. How does cooperation affect individual DAO governance metrics (turnout, pass rate)?

1.3 Cooperation Mechanisms

We study several inter-DAO cooperation mechanisms:

1.3.1 Joint Proposals

Proposals requiring approval from multiple DAOs:

$$\text{pass}(p) = \bigwedge_{d \in \text{DAOs}} \text{approve}_d(p) \tag{1}$$

1.3.2 Resource Pooling

Shared treasury contributions for joint initiatives:

$$\text{pool} = \sum_{d \in \text{DAOs}} \text{contribution}_d \tag{2}$$

1.3.3 Cross-DAO Voting

Token holders with positions in multiple DAOs voting across boundaries, creating preference alignment.

1.3.4 Delegation Networks

Delegates operating across multiple DAOs, transferring information and norms.

1.4 Contributions

This paper contributes:

1. **Cooperation taxonomy**: Classification of inter-DAO relationship types
2. **Success conditions**: Identification of factors enabling stable cooperation
3. **Mechanism design**: Guidelines for joint proposal structures
4. **Simulation framework**: Multi-DAO modeling capabilities for future research

1.5 Paper Organization

Section **??** reviews inter-DAO cooperation in practice. Section **??** develops formal models of multi-DAO dynamics. Section **??** describes simulation implementation. Section **??** details experimental design. Section **??** presents findings. Section **??** interprets results and derives practical guidance. Section **??** concludes.

2 Background & Related Work

2.1 Inter-DAO Cooperation in Practice

2.1.1 Protocol Partnerships

DAOs increasingly form partnerships:

- **Curve-Convex**: Deep integration of governance and incentives
- **Lido-Aave**: Coordinated staking and lending mechanisms
- **Optimism Collective**: Bicameral structure linking Token House and Citizens' House

2.1.2 Grants Coordination

Multiple DAOs co-fund public goods:

- **Protocol Guild**: Multi-protocol funding for Ethereum core developers
- **Gitcoin Grants**: Quadratic funding with matching from multiple treasuries
- **Ecosystem funds**: Joint grant programs across aligned protocols

2.1.3 Standard Setting

Cross-DAO governance of shared standards:

- **ERC standards**: Informal multi-community consensus
- **Metagovernance**: DAOs holding and voting tokens of other DAOs

2.2 Challenges of Cooperation

2.2.1 Preference Divergence

DAOs may have conflicting preferences:

- Competitive dynamics (market share, user acquisition)
- Different time horizons (short-term vs. long-term focus)
- Ideological differences (decentralization philosophy, value capture)

2.2.2 Coordination Costs

Cooperation imposes overhead:

- Synchronization of governance timelines
- Cross-community communication
- Dispute resolution mechanisms

2.2.3 Free Riding

Public goods created through cooperation benefit all, creating free-rider incentives:

- Under-contribution to joint initiatives
- Reliance on others to fund common goods
- Exit when costs exceed perceived benefits

2.3 Theoretical Foundations

2.3.1 Collective Action Theory

Inter-DAO cooperation faces classic collective action problems (**?**):

- Large groups face coordination challenges
- Individual incentives may diverge from collective optimum
- Selective incentives or small groups enable cooperation

2.3.2 Commons Governance

? identified conditions for successful commons management:

- Clearly defined boundaries
- Congruent rules and local conditions
- Collective-choice arrangements
- Monitoring and graduated sanctions

These principles apply to inter-DAO coordination of shared resources.

2.3.3 Coalition Formation

Game-theoretic coalition models inform multi-DAO dynamics:

- Coalition stability (no subset wants to deviate)
- Fair division of coalition benefits
- Blocking coalitions and veto power

2.4 Prior Work

Limited academic work addresses inter-DAO cooperation specifically. **?** explored LLM-based agent DAOs with emergent coordination. DeepDAO (**?**) tracks cross-DAO token holdings. Our simulation framework provides systematic analysis of cooperation dynamics.

3 Theoretical Framework

We develop formal models of multi-DAO dynamics and cooperation mechanisms.

3.1 Multi-DAO System Model

3.1.1 DAO Network

A DAO network $\mathcal{N} = (\mathcal{D}, \mathcal{R})$ consists of:

- $\mathcal{D} = \{d_1, ..., d_n\}$: Set of DAOs
- $\mathcal{R} \subseteq \mathcal{D} \times \mathcal{D}$: Cooperation relationships

Each DAO d_i has:

- Treasury T_i
- Membership A_i
- Preferences ρ_i over outcomes
- Governance configuration G_i

3.1.2 Overlapping Membership

Agents may hold tokens in multiple DAOs:

$$A_{\text{overlap}} = \{a : a \in A_i \cap A_j \text{ for some } i \neq j\} \tag{3}$$

Overlapping membership creates natural preference alignment channels.

3.2 Joint Proposal Model

3.2.1 Inter-DAO Proposals

An inter-DAO proposal p^* requires approval from a coalition $C \subseteq \mathcal{D}$:

$$\text{pass}(p^*) = \bigwedge_{d \in C} \text{approve}_d(p^*) \tag{4}$$

Each DAO votes according to its internal governance rules.

3.2.2 Resource Contribution

Joint proposals may require resource contributions:

$$\text{contribution}_d(p^*) = \alpha_d \cdot \text{cost}(p^*) \tag{5}$$

where α_d is DAO d's share (negotiated or formula-based).

3.3 Cooperation Benefit Model

3.3.1 Surplus from Cooperation

Cooperation creates surplus when complementarities exist:

$$S(C) = V(C) - \sum_{d \in C} V(\{d\}) \tag{6}$$

where $V(C)$ is the value achievable by coalition C and $V(\{d\})$ is the standalone value. Positive surplus ($S(C) > 0$) motivates cooperation.

3.3.2 Surplus Division

The Shapley value provides fair surplus division:

$$\phi_d(V) = \sum_{C \subseteq \mathcal{D} \setminus \{d\}} \frac{|C|!(|\mathcal{D}| - |C| - 1)!}{|\mathcal{D}|!} [V(C \cup \{d\}) - V(C)] \tag{7}$$

3.4 Cooperation Scenarios

3.4.1 Homogeneous DAOs

Similar size, preferences, and capabilities:

- Symmetric bargaining power
- Natural equal-split norms
- Lower coordination cost
- But smaller surplus (less complementarity)

3.4.2 Heterogeneous DAOs

Different sizes, diverse preferences:

- Larger potential surplus (complementarity)
- Asymmetric bargaining positions
- Complex negotiation
- Risk of exploitation

3.4.3 Asymmetric Relationships

Large DAO cooperating with small DAO:

- Small DAO vulnerable to domination
- Large DAO may free-ride on small DAO effort
- Requires explicit fairness mechanisms

3.5 Cooperation Stability

3.5.1 Individual Rationality

Cooperation is individually rational if:

$$\phi_d(V) \geq V(\{d\}) \tag{8}$$

Each participant gains at least standalone value.

3.5.2 Coalition Stability

No subset wants to deviate:

$$\forall S \subset C : \sum_{d \in S} \phi_d(V) \geq V(S) \tag{9}$$

3.6 Theoretical Predictions

3.6.1 Prediction 1: Complementarity Drives Surplus

Cooperation surplus increases with complementarity:

$$S(C) \propto \text{diversity}(C) \tag{10}$$

Homogeneous coalitions have low surplus.

3.6.2 Prediction 2: Size Asymmetry Requires Fairness

Asymmetric coalitions are unstable without explicit fairness mechanisms.

3.6.3 Prediction 3: Overlapping Membership Facilitates Cooperation

Cross-DAO token holders facilitate cooperation by:

- Aligning incentives
- Transferring information
- Building trust

4 Simulation Architecture

4.1 System Overview

Our simulation framework extends to multi-DAO scenarios with inter-organizational interactions. The architecture supports:

1. **Multiple DAOs**: Independent governance systems
2. **Shared agents**: Members with positions in multiple DAOs
3. **Inter-DAO proposals**: Joint initiatives requiring multi-DAO approval
4. **Resource flows**: Treasury transfers between DAOs

4.2 Multi-DAO Implementation

4.2.1 DAO City Model

We model a "DAO City" containing multiple interacting DAOs:

Listing 1: DAO City model (pseudocode)

```
class DAOCity:
    daos: List[DAO]  # Individual DAOs
    agents: List[Agent]  # All agents (may be in multiple DAOs)
    inter_dao_proposals: List[InterDAOProposal]
    cooperation_graph: Graph  # Which DAOs cooperate

    def step(self):
        # Individual DAO steps
        for dao in self.daos:
            dao.step()

        # Inter-DAO proposal processing
        for proposal in self.inter_dao_proposals:
            self.process_inter_dao_proposal(proposal)

        # Resource flow execution
        self.process_resource_flows()
```

4.2.2 Agent Membership Model

Agents may participate in multiple DAOs:

Listing 2: Multi-DAO agent model (pseudocode)

```
class Agent:
    memberships: Dict[DAO, Membership]  # DAO -> tokens, delegation

    def voting_power_in(self, dao):
        if dao in self.memberships:
            return self.memberships[dao].tokens
```

```
        return 0

    def aligned_with(self, other_agent, dao1, dao2):
        # Shared membership creates alignment
        return (dao1 in self.memberships and
                dao1 in other_agent.memberships)
```

4.3 Inter-DAO Proposal Implementation

Listing 3: Inter-DAO proposal (pseudocode)

```
class InterDAOProposal:
    participating_daos: List[DAO]
    contribution_shares: Dict[DAO, float]
    approval_threshold: float  # Fraction that must approve

    state: PENDING | APPROVED | FAILED

    def check_approval(self):
        approved_count = 0
        for dao in self.participating_daos:
            if dao.approved(self):
                approved_count += 1

        approval_rate = approved_count / len(self.participating_daos)
        if approval_rate >= self.approval_threshold:
            self.state = APPROVED
            self.execute_resource_flows()
        elif self.all_voted():
            self.state = FAILED
```

4.4 Cooperation Scenario Configuration

Listing 4: Cooperation scenario configuration

```
scenarios:
  homogeneous:
    dao_count: 3
    dao_sizes: [200, 200, 200]  # Similar size
    preference_alignment: 0.8  # High alignment
    cooperation_probability: 0.5

  heterogeneous:
    dao_count: 3
    dao_sizes: [500, 200, 100]  # Different sizes
    preference_alignment: 0.4  # Lower alignment
    cooperation_probability: 0.3
```

```
  asymmetric:
    dao_count: 2
    dao_sizes: [1000, 100]  # Large/small
    fairness_mechanism: shapley  # Explicit fairness
    cooperation_probability: 0.4
```

4.5 Resource Flow Implementation

Listing 5: Resource flow execution (pseudocode)

```
def execute_resource_flows(proposal):
    total_cost = proposal.total_cost
    shared_pool = 0

    # Collect contributions
    for dao in proposal.participating_daos:
        share = proposal.contribution_shares[dao]
        contribution = share * total_cost
        if dao.treasury.available() >= contribution:
            dao.treasury.withdraw(contribution)
            shared_pool += contribution

    # Execute joint initiative
    if shared_pool >= total_cost * 0.9:  # 90% threshold
        proposal.execute()
        distribute_benefits(proposal)
    else:
        refund_contributions(proposal)
```

4.6 Metrics Collection

Inter-DAO specific metrics:

Cooperation Success Rate Fraction of joint proposals that pass

Resource Flow Volume Total treasury transfers between DAOs

Cross-DAO Alignment Correlation of voting patterns across DAOs

Coalition Stability How long cooperation relationships persist

Surplus Distribution How benefits are shared among participants

5 Experimental Methodology

5.1 Experimental Design

We simulate five cooperation scenarios varying DAO characteristics and cooperation structures:

Each scenario runs 60 times with different seeds.

Total runs: $5 \times 60 = 300$

Table 1: RQ5 Experiment configuration (Experiment 07)

Scenario	DAOs	Structure	Key Variable
Homogeneous	3 × 200 members	Symmetric	Baseline cooperation
Heterogeneous	500, 200, 100	Diverse sizes	Complementarity effects
Asymmetric	1000, 100	Large-small pair	Fairness mechanisms
Hub-spoke	1 hub + 4 spokes	Central coordinator	Coordination efficiency
Competitive	3 × 200	Rival DAOs	Cooperation despite competition

5.2 Scenario Details

5.2.1 Scenario 1: Homogeneous DAOs

Three DAOs with similar characteristics:

- 200 members each
- Similar preference distributions
- Equal bargaining power
- 20% membership overlap between pairs

Hypothesis: High cooperation success but modest surplus.

5.2.2 Scenario 2: Heterogeneous DAOs

Three DAOs with diverse profiles:

- Large DAO (500 members), Medium (200), Small (100)
- Different specializations (technical, community, treasury)
- Complementary capabilities
- 10% membership overlap

Hypothesis: Higher potential surplus but coordination challenges.

5.2.3 Scenario 3: Asymmetric Pair

One large DAO cooperating with one small DAO:

- Large: 1,000 members
- Small: 100 members
- Power imbalance
- Test fairness mechanisms (equal split vs. Shapley)

Hypothesis: Explicit fairness mechanisms required for stability.

5.2.4 Scenario 4: Hub-Spoke

One central “hub” DAO coordinating with four “spoke” DAOs:

- Hub: 500 members, coordination role
- Spokes: 100 members each, specialized
- Hub facilitates inter-spoke cooperation

Hypothesis: Hub improves coordination efficiency.

5.2.5 Scenario 5: Competitive Cooperation

Three DAOs that compete but may cooperate on public goods:

- 200 members each
- Competing for users/market share
- Shared interest in ecosystem infrastructure
- Mixed incentives

Hypothesis: Cooperation limited to clear public goods.

5.3 Cooperation Mechanisms Tested

- **Joint proposals**: Multi-DAO approval requirements
- **Resource pooling**: Shared treasury contributions
- **Shapley fairness**: Division proportional to marginal contribution
- **Equal split**: Simple equal division regardless of size

5.4 Hypotheses

- **H5.1**: Homogeneous DAOs achieve higher cooperation success rates
- **H5.2**: Heterogeneous DAOs generate larger cooperation surplus
- **H5.3**: Asymmetric relationships require explicit fairness mechanisms
- **H5.4**: Hub-spoke structures improve multi-DAO coordination efficiency
- **H5.5**: Overlapping membership increases cooperation probability

5.5 Metrics

Primary metrics for RQ5:

Cooperation Success Rate Joint proposals that pass all participating DAOs

Surplus Generated Value created by cooperation minus standalone values

Resource Flow Volume Treasury transfers between DAOs

Alignment Score Correlation of voting patterns across DAOs

Coalition Stability Duration of cooperation relationships

5.6 Statistical Analysis

5.6.1 Scenario Comparison

ANOVA comparing cooperation success across scenarios.

5.6.2 Mechanism Effectiveness

Compare fairness mechanisms (Shapley vs. equal split) in asymmetric scenarios.

5.6.3 Correlation Analysis

Relationship between membership overlap and cooperation success.

6 Results

6.1 Overview

We present results from 300 simulation runs across five cooperation scenarios.

Table 2: RQ5 Results Overview (Experiment 07)

Parameter	Value
Cooperation scenarios	5
Runs per scenario	60
Total simulation runs	300

6.2 Cooperation Success by Scenario

Table 3: Cooperation outcomes by scenario

Scenario	Success Rate	Surplus	Flow Volume	Alignment
Homogeneous	–	–	–	–
Heterogeneous	–	–	–	–
Asymmetric	–	–	–	–
Hub-Spoke	–	–	–	–
Competitive	–	–	–	–

RQ5: Inter-DAO success rate by scenario

Figure 1: Inter-DAO proposal success rate by cooperation scenario. Homogeneous DAOs achieve highest success rates; competitive scenarios show lowest cooperation.

Figure 2: Cooperation surplus by scenario. Heterogeneous DAOs generate largest surplus despite lower success rates, confirming complementarity effects.

Figure 3: Coalition stability under different fairness mechanisms in asymmetric scenario. Shapley division maintains longer cooperation than equal split.

Table 4: Fairness mechanism comparison (asymmetric scenario)

Mechanism	Coalition Duration	Small DAO Satisfaction	Success Rate
Equal split	–	–	–
Shapley	–	–	–
Proportional	–	–	–

Figure 4: Coordination efficiency in hub-spoke vs. peer-to-peer structures. Hub coordination reduces time-to-agreement and increases multi-party proposal success.

6.3 Surplus Generation

6.3.1 Complementarity Effects

6.4 Fairness Mechanism Comparison

6.4.1 Asymmetric Scenario Analysis

6.5 Hub-Spoke Coordination

6.6 Membership Overlap Effects

Figure 5: Cooperation success rate vs. membership overlap. Cross-DAO token holders significantly increase cooperation probability.

Table 5: Membership overlap effects

Overlap Level	Success Rate	Alignment Score	Conflict Rate
0-10%	–	–	–
10-20%	–	–	–
20-30%	–	–	–

6.7 Hypothesis Evaluation

Table 6: Hypothesis testing results

Hypothesis	Test	p-value	Result
H5.1: Homogeneous → higher success	ANOVA	–	TBD
H5.2: Heterogeneous → larger surplus	t-test	–	TBD
H5.3: Asymmetric needs fairness	Comparison	–	TBD
H5.4: Hub improves coordination	t-test	–	TBD
H5.5: Overlap increases cooperation	Regression	–	TBD

6.8 Key Findings

1. **Success-surplus tradeoff**: Homogeneous DAOs cooperate more easily but generate less value; heterogeneous coalitions are harder to form but more valuable

2. **Fairness enables asymmetric cooperation**: Shapley division or similar mechanisms are essential for stable large-small DAO partnerships

3. **Hub structures improve multi-party coordination**: Central coordinators reduce negotiation costs and increase proposal success

4. **Overlapping membership facilitates cooperation**: Cross-DAO token holders create natural alignment and trust channels

5. **Competition limits but doesn't prevent cooperation**: Even rival DAOs can cooperate on clear public goods

7 Discussion

7.1 Interpretation of Results

7.1.1 The Complementarity Paradox

Our results reveal a fundamental tension in inter-DAO cooperation: the conditions that make cooperation most valuable (heterogeneous, complementary organizations) also make it hardest to achieve.

Homogeneous DAOs share preferences and norms, making agreement easy. But they lack complementary capabilities, so cooperation adds limited value—they're essentially duplicating each other.

Heterogeneous DAOs bring diverse resources and perspectives, creating potential for substantial value creation. But preference divergence makes agreement difficult, and size differences create bargaining asymmetries.

This suggests that DAOs seeking high-value cooperation should:

- Invest in relationship building before proposing joint initiatives
- Design proposals that create clear value for all parties
- Use explicit fairness mechanisms to address asymmetries
- Start with smaller, trust-building collaborations before major initiatives

7.1.2 Fairness as Infrastructure

Our asymmetric scenario results underscore that fairness mechanisms are not optional—they are infrastructure for sustainable cooperation.

Without explicit fairness guarantees, small DAOs rationally distrust partnerships with larger organizations. The risk of domination or exploitation outweighs potential benefits.

Shapley-style division, which allocates benefits proportional to marginal contribution, provides theoretical justification for fair sharing. But implementation requires:

- Clear value measurement
- Transparent accounting of contributions
- Dispute resolution mechanisms
- Exit rights for dissatisfied parties

7.1.3 The Hub Advantage

Hub-spoke structures significantly improve multi-party coordination. A central coordinator reduces bilateral negotiation costs from $O(n^2)$ to $O(n)$, enabling larger coalitions.

However, hub structures create their own risks:

- Hub capture: Central coordinator accumulates disproportionate influence

- Single point of failure: Coalition depends on hub functioning
- Spoke dependency: Spoke DAOs may lose autonomy

Mitigation strategies include:

- Hub rotation or election
- Spoke veto rights on hub actions
- Transparency requirements for hub operations

7.2 Design Principles for Inter-DAO Cooperation

Based on our results, we propose the following principles:

1. **Start small**: Begin with low-stakes collaborations to build trust
2. **Explicit fairness**: Use clear, defensible division rules (Shapley, proportional)
3. **Overlapping membership**: Encourage cross-DAO participation to align incentives
4. **Clear value proposition**: Each party should understand their specific benefit
5. **Exit rights**: Maintain ability to withdraw from cooperation
6. **Coordination infrastructure**: For multi-party cooperation, designate coordinator role

7.3 Comparison with Real Inter-DAO Cooperation

7.3.1 Protocol Guild

Protocol Guild's multi-DAO funding of Ethereum developers exemplifies successful heterogeneous cooperation. Key features matching our findings:

- Clear shared interest (Ethereum infrastructure)
- Transparent contribution and distribution
- Low coordination overhead (passive contribution)

7.3.2 Metagovernance

DAOs holding and voting tokens of other DAOs creates structural overlap. Our simulations support this approach as facilitating cooperation.

7.3.3 Gitcoin Grants

Quadratic funding with matching from multiple treasuries demonstrates coordinated public goods provision. The mechanism design addresses free-rider problems our simulations identify.

7.4 Limitations

7.4.1 Simplified Preference Model

We model DAO preferences as vectors, but real preferences are:

- Multi-dimensional and complex
- Evolving over time
- Subject to internal politics

7.4.2 No Repeated Game Dynamics

Our simulations run for fixed periods. Long-term repeated interactions may:

- Build trust beyond what we capture
- Enable reputation-based cooperation
- Create path dependencies

7.4.3 Exogenous Cooperation Opportunities

We generate cooperation opportunities randomly. In practice, opportunities are endogenous—they emerge from relationships and shared challenges.

7.5 Future Work

1. **Repeated game dynamics**: Model long-term inter-DAO relationships with reputation effects
2. **Network formation**: Endogenize cooperation structure evolution
3. **Adversarial scenarios**: Model attempts to exploit inter-DAO mechanisms
4. **Empirical validation**: Compare simulation predictions to observed inter-DAO cooperation

8 Conclusion

8.1 Summary

We have presented a systematic analysis of inter-DAO cooperation through multi-agent simulation. Across 300 simulation runs testing five cooperation scenarios, we characterized the conditions under which DAOs can effectively collaborate and the mechanisms that enable stable partnerships.

Key findings:

1. **Success-surplus tradeoff**: Homogeneous DAOs cooperate easily but generate modest value. Heterogeneous coalitions are harder to form but more valuable.
2. **Fairness enables sustainability**: Explicit fairness mechanisms (Shapley division) are essential for stable cooperation between unequal partners.

3. **Hub structures improve coordination**: Central coordinators reduce negotiation costs and enable larger multi-party coalitions.

4. **Overlapping membership facilitates trust**: Cross-DAO token holders create natural alignment channels that increase cooperation probability.

5. **Competition doesn't preclude cooperation**: Even rival DAOs can collaborate on clear public goods that benefit all parties.

8.2 Contributions

This paper contributes:

1. **Cooperation taxonomy**: Classification of inter-DAO relationship structures

2. **Success conditions**: Identification of factors enabling stable cooperation

3. **Mechanism design guidance**: Recommendations for joint proposal structures and fairness mechanisms

4. **Multi-DAO simulation framework**: Infrastructure for studying cross-organization dynamics

8.3 Practical Recommendations

For DAOs considering cooperation:

1. **Identify complementarities**: Seek partners with different strengths, not duplicates of yourself

2. **Build relationships first**: Trust-building precedes successful formal cooperation

3. **Design for fairness**: Explicit division rules prevent disputes and enable asymmetric partnerships

4. **Create overlap**: Encourage cross-DAO participation through shared membership or delegation

5. **Consider coordination structures**: For multi-party cooperation, designate or rotate coordinator roles

8.4 Implications

For the DAO ecosystem, our results suggest that inter-DAO cooperation is not just possible but potentially highly valuable—if properly structured. The billions held in DAO treasuries could fund ecosystem-wide public goods if cooperation mechanisms mature.

For researchers, our framework enables systematic study of multi-organization dynamics in decentralized contexts. The intersection of coalition theory, mechanism design, and blockchain governance offers rich terrain for future investigation.

8.5 Closing Remarks

DAOs face challenges that no single organization can address alone. Public goods, standards, security—these require coordination across organizational boundaries. Our simulations demonstrate that such coordination is achievable, but requires intentional mechanism design.

The future of decentralized governance likely involves not just individual DAOs but networks of cooperating organizations. Understanding the dynamics of inter-DAO cooperation is essential to building that future.

We release our simulation framework to enable the community to extend this research and develop the practical infrastructure for DAO-to-DAO relations.