

A Comprehensive Study of Governance Issues in Decentralized Finance Applications

Wei Ma

Chenguang Zhu

Ye Liu

Xiaofei Xie

Yi Li

Nanyang Technology University

The University of Texas at Austin

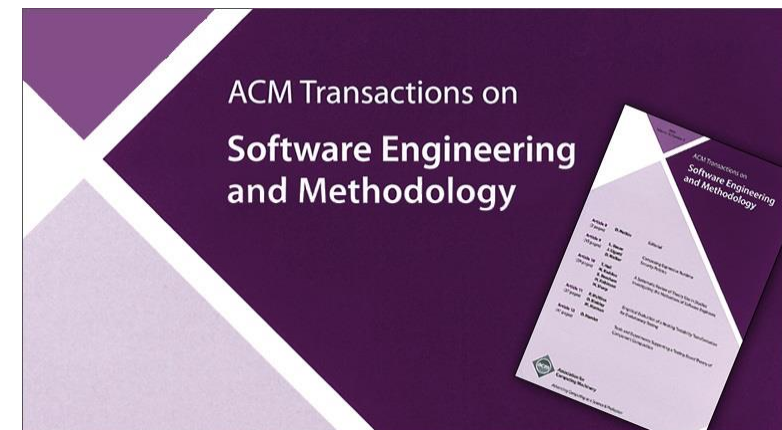
Nanyang Technology University

Singapore Management University

Nanyang Technology University

FSE 2025

June 24, 2025

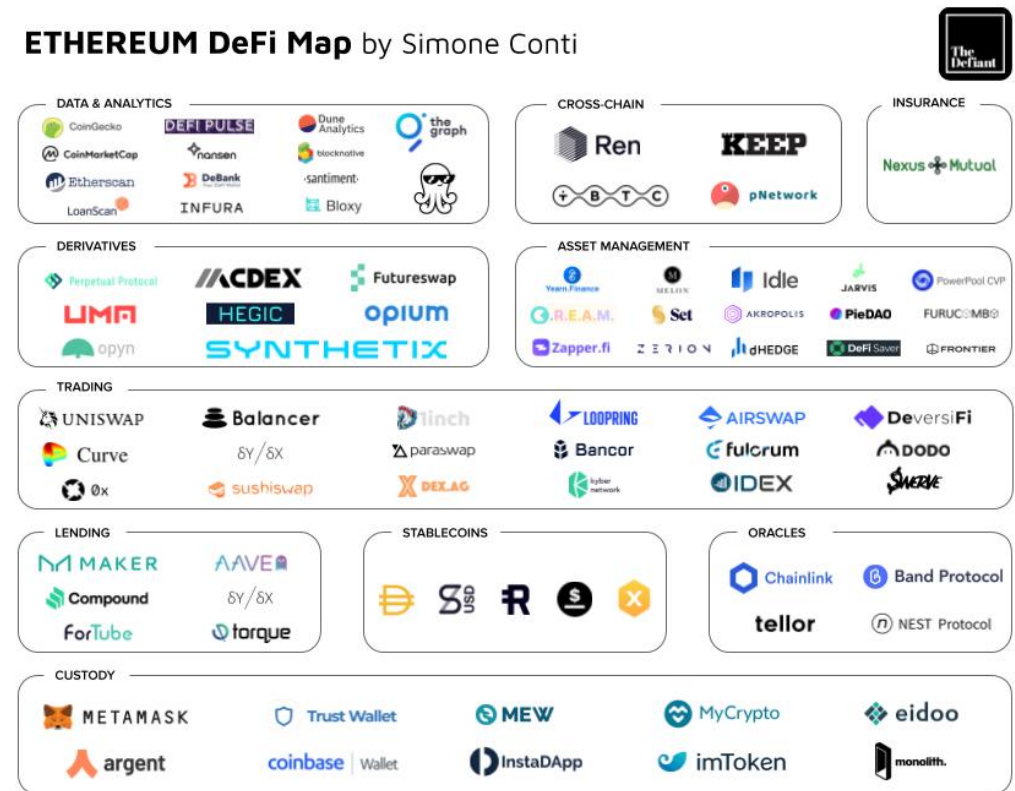


What is Decentralization Finance (DeFi)?

DeFi is an ecosystem of financial software applications that are built on blockchain using **smart contracts**

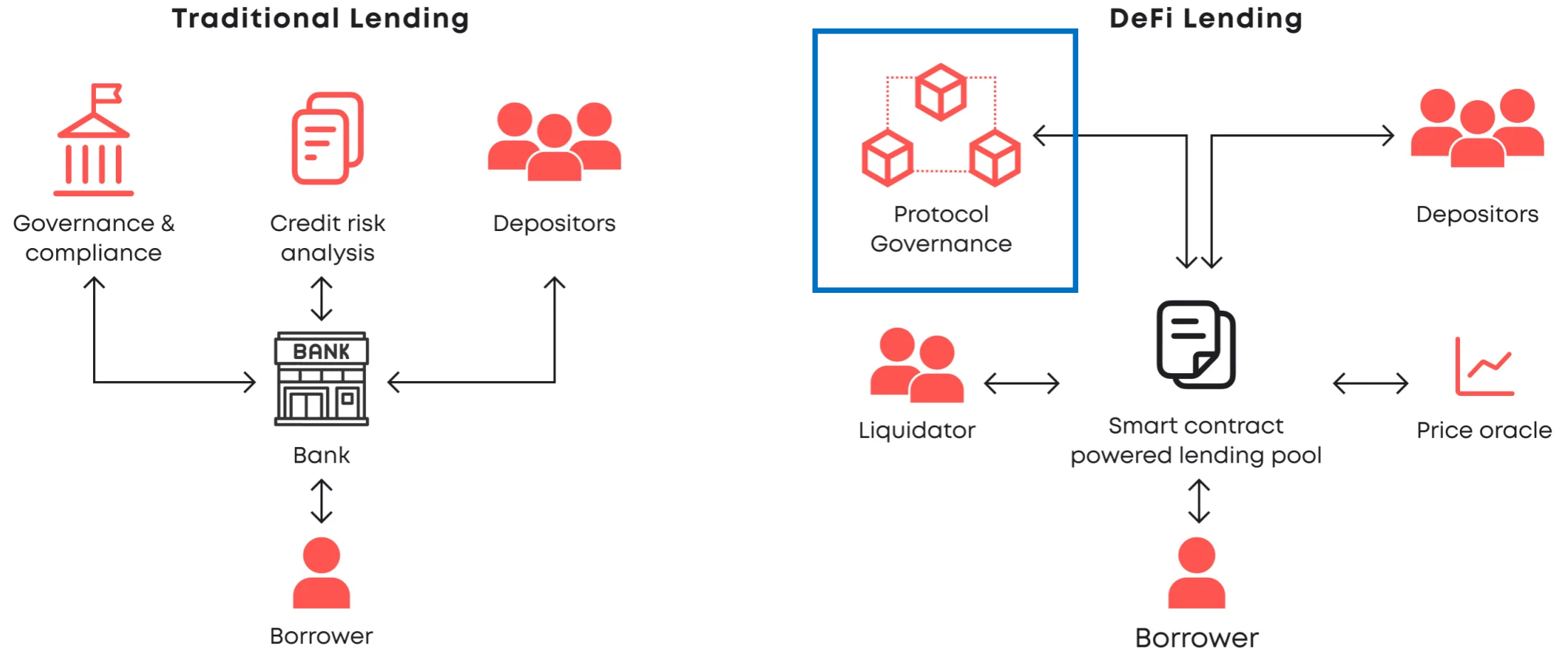


ETHEREUM DeFi Map by Simone Conti



Source: <https://thedefiant.io/defi-projects-map/>

How does DeFi work?



What is DeFi Governance?

The democratic **foundation** of DeFi



DeFi Governance

Control



DeFi Protocol



Protocol Changes

Parameters

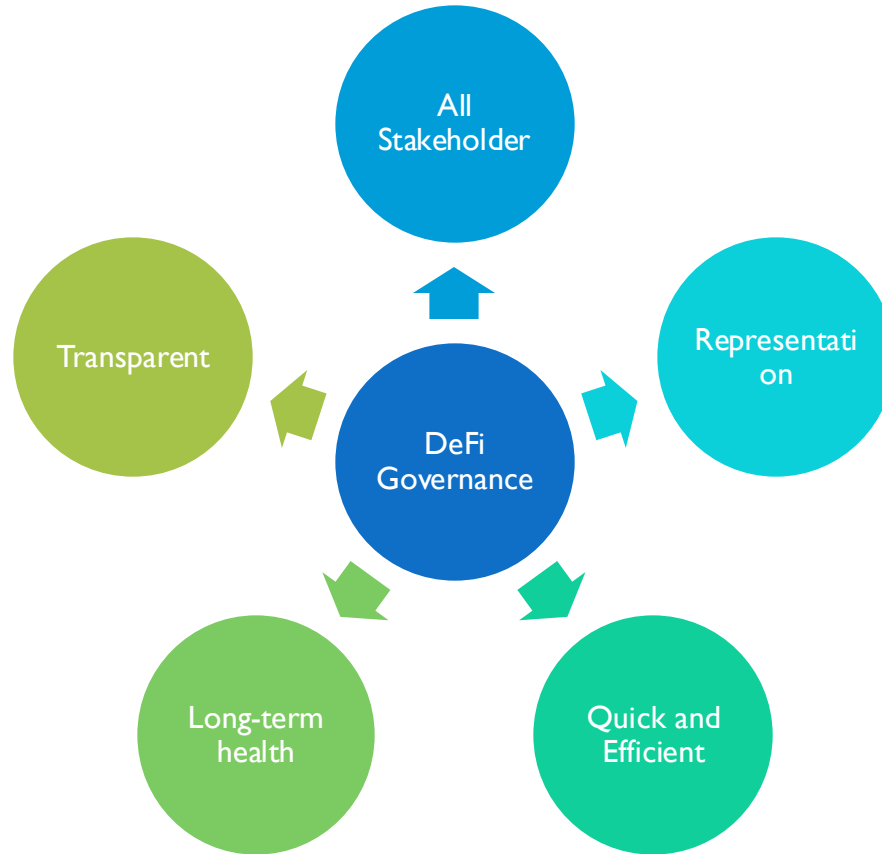
Strategy Shifts

Treasury Management

DeFi Governance Issues



My
Money
is SAFE!



DeFi Governance Issues



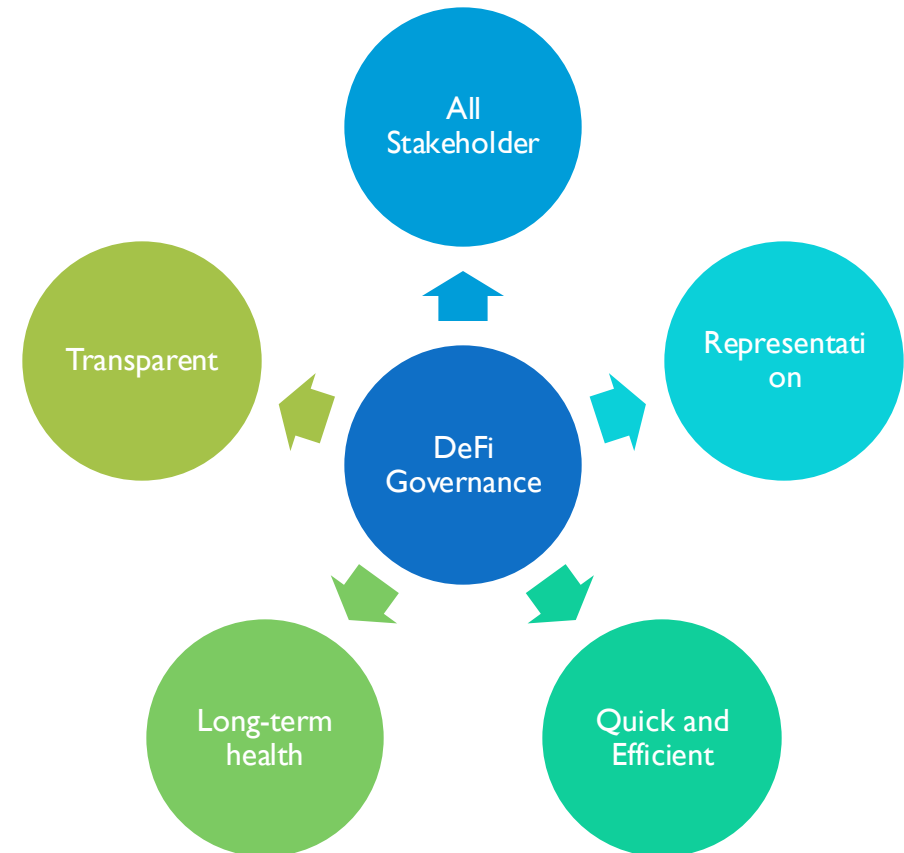
Reality



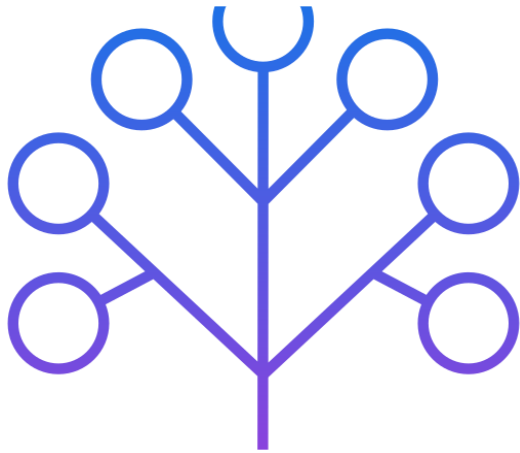
- Rug Pull
- Whale Dominance
- Hidden strategy
-



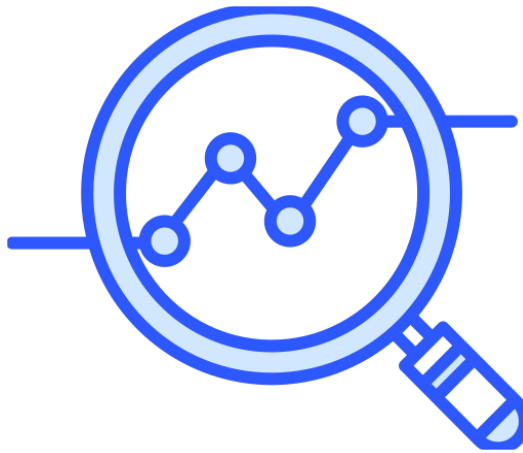
What is
the
Gap?



Our Study on DeFi Governance Issues



Taxonomy

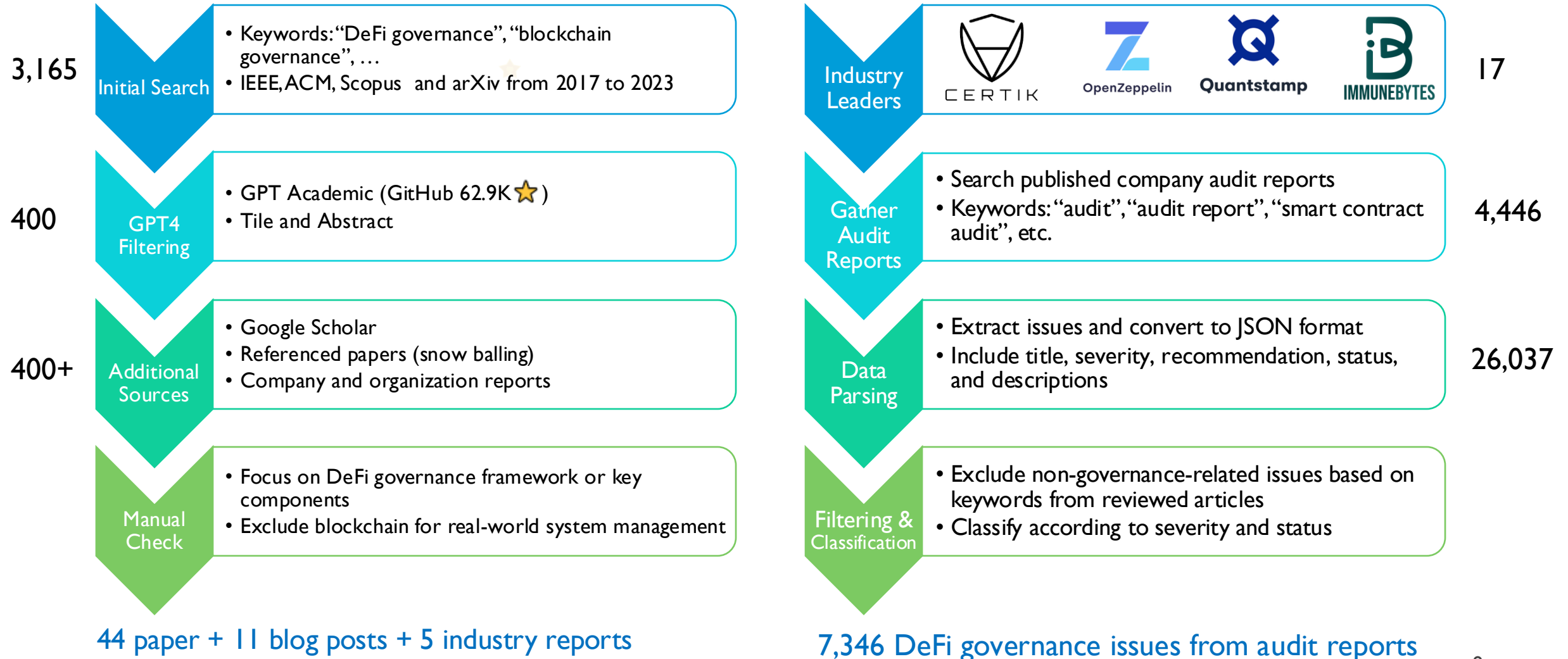


Issue Analysis



Recommendations

Data Collection: Papers + Audit Reports



Research Questions

RQ1

- Which governance taxonomy is most suitable for analyzing DeFi governance concepts?

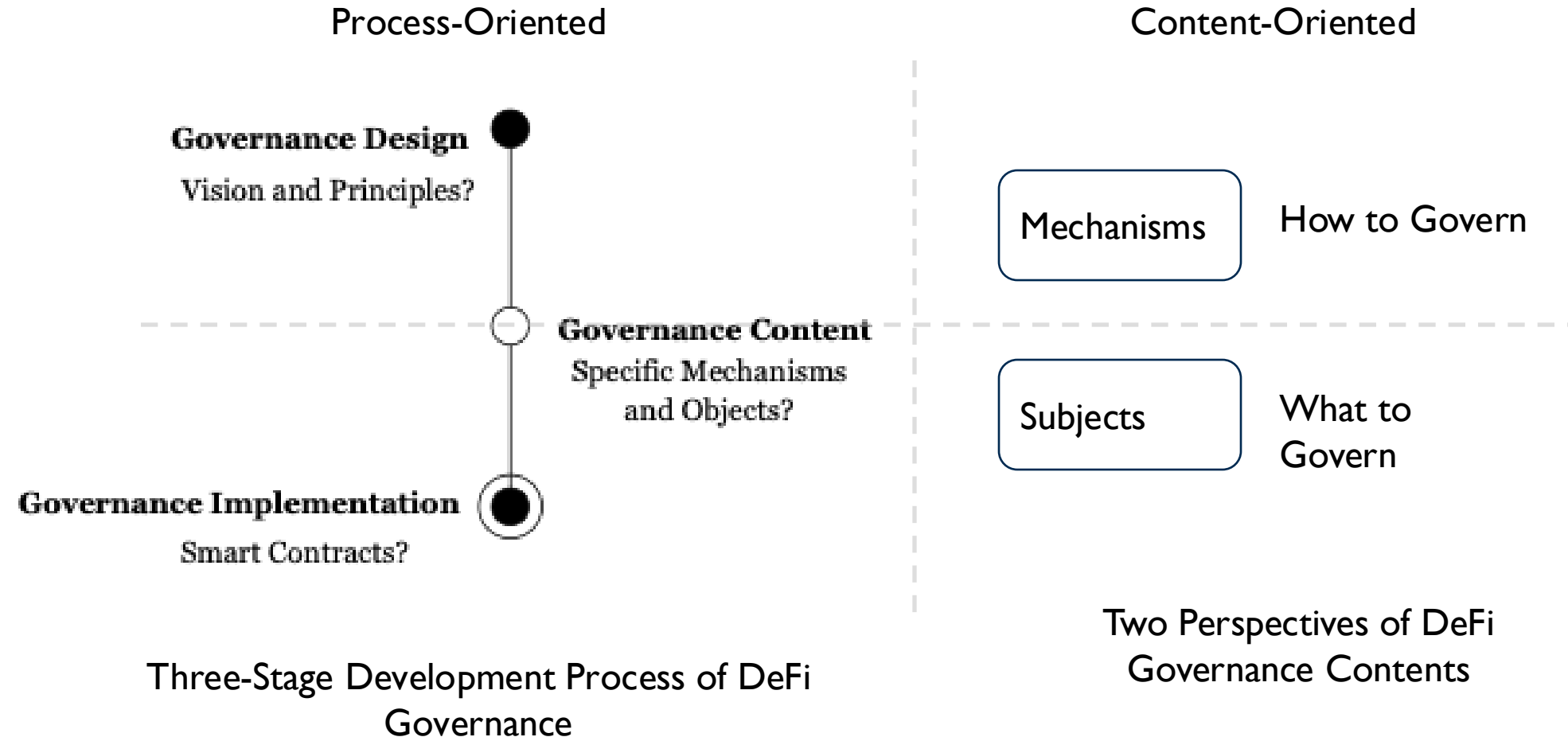
RQ2

- What are the common governance issues in DeFi applications?

RQ3

- How closely do DeFi developers follow governance designs in whitepapers during the development?

RQI: Two different views on DeFi governance



RQ1: Taxonomy and Related Keywords

	Category	Subcategory	Keywords	Citations
How?	Governance Mechanism	Governance Token	governance token, vote, proposal, decision-making, tally, abstention, quorum, veto	[18, 41, 43, 80, 101, 110], [15, 22, 60, 100, 110]
		Ownership	owner, ownership, privilege	
What?	Tokenomics	Utility Token	supply, token distribution, token name, token usage, asset token, token utility	[18, 22, 34, 61, 67, 89], [14, 18, 52, 59, 64]
		Revenue Stream	transaction fee, trading fee, marketplace fee, borrow rate, protocol fee, premium fee, performance fee, token issuance, generic fee, interest rate, charge a fee	
		Incentive Mechanism	lock up, total value locked, yield, borrow, airdrop, burn, stake, liquidity, lend, loan, referral, mint, incentive	
	Codebase	Code	update contract, upgradable	[1, 6, 44, 47, 57, 91]

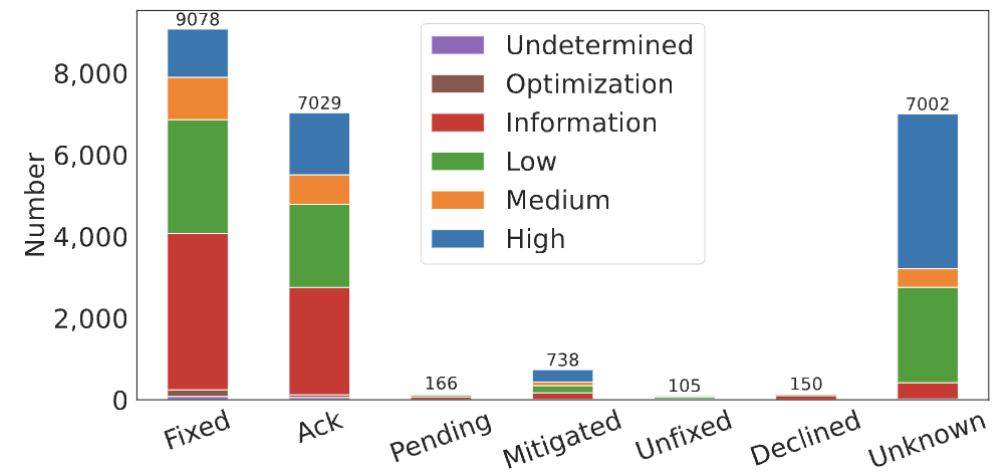
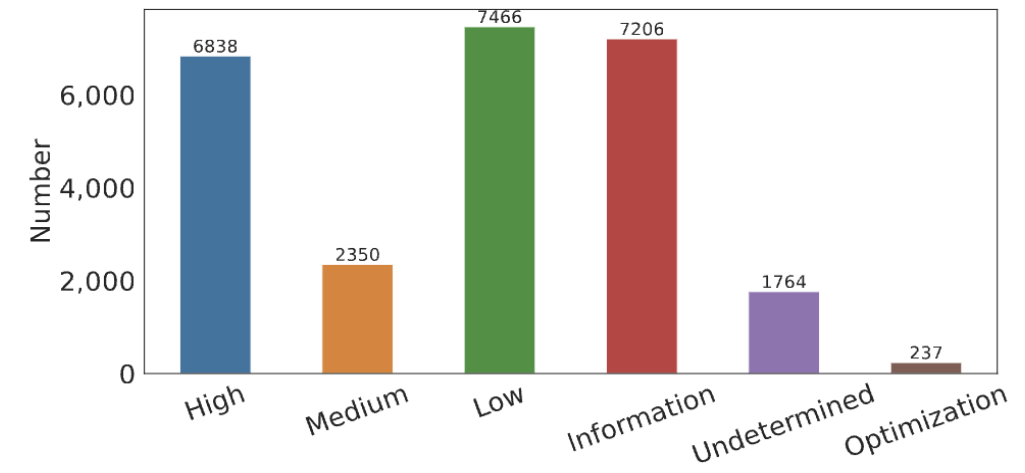
RQ2: Analysis of Governance Issues

Governance Issue Distribution by Category

Categories	Number of Issues
Ownership	4,803
Incentive Mechanisms	3,597
Utility Token	552
Governance Token	360
Revenue Stream	220
Codebase	56

Note: some issues may belong to multiple categories

Distribution of Issue Severity and Resolution Status



RQ2: Analysis of Governance Issues

In terms of their **root causes**: Two Main Types of Governance Issues 

Technology-Centric Issues

- Contract update issues
- Code optimization problems
- Logical vulnerabilities
- Implementation errors

Solution: Can be addressed through technology updates and iterations

Human-Centric Issues

- Centralized structures
- Privileged functions
- Unfair economic models
- Design-implementation gaps

Solution: Require human intervention and better governance understanding

RQ2: Key Takeaways

- **Ownership dominance:** 65.4% of governance issues relate to ownership problems
- **Poor resolution rate:** Only 23.33% of high-severity issues are actually fixed
- **Triage difficulty:** 21.78% of issues have undetermined severity
- **Inadequate attention:** DeFi teams don't prioritize governance issues appropriately
- **Human factor:** Many issues stem from design flaws rather than technical bugs



Recommendation

DeFi projects need better [governance frameworks](#), enhanced auditor guidelines for [issue triage](#), and stronger emphasis on addressing [ownership and incentive mechanism design](#) from the earliest development stages.

RQ3: Design-Implementation Consistency in DeFi

How closely do DeFi developers follow governance designs in whitepapers during development?

15

DeFi Projects Analyzed

104

Tokenomics Configurations

136

Design-Related Issues Found



Surprising Result

Only **2** out of 15 projects (13.3%) had completely consistent implementations

74% Consistent Configurations
(77 out of 104)

26% Inconsistent
(27 out of 104)

RQ3: Design-Implementation Consistency in DeFi

Types of Inconsistencies Found

Inconsistency Type	Description	Impact
Token Supply Discrepancies	Total tokens initialized didn't match whitepaper specifications	● Affects tokenomics balance
Fee Ratio Differences	Transaction fees higher than stated, benefiting project teams	● Unfair user treatment
Hidden Functions	Undocumented capabilities (e.g., unlimited token minting)	● Potential for abuse



Real Example

AST-Finance: Whitepaper claimed “no fees” but implementation charged deposit fees.



Hidden Mint Functions

Codelinc Example: Developers could mint unlimited tokens and destroy them for additional benefits, never documented in governance design.



RQ3: Key Takeaways



Root Causes & Implications

26%

Configuration Inconsistency Rate

87%

Projects with Issues



Possible Reasons for Inconsistencies:

- **Deliberate actions** by project teams for additional benefits
- **Development changes** not reflected in documentation updates
- **Poor documentation practices** during development lifecycle
- **Lack of validation processes** between design and implementation



Critical Impact

While these issues may not directly lead to security vulnerabilities, they significantly affect the distribution of benefits in DeFi projects and undermine user trust.

Summary



yi_li@ntu.edu.sg



@liyistc



Key Research Findings

1

Ownership dominates governance issues

65.38% of severe governance problems are ownership-related, making it the most critical challenge

2

Poor resolution rates

Only 23.33% of high-severity governance issues are actually fixed by development teams

3

Widespread inconsistencies

87% of DeFi projects (13/15) show discrepancies between whitepaper designs and implementations

4

Inadequate attention

DeFi teams don't prioritize governance issues despite their potential for systemic risks



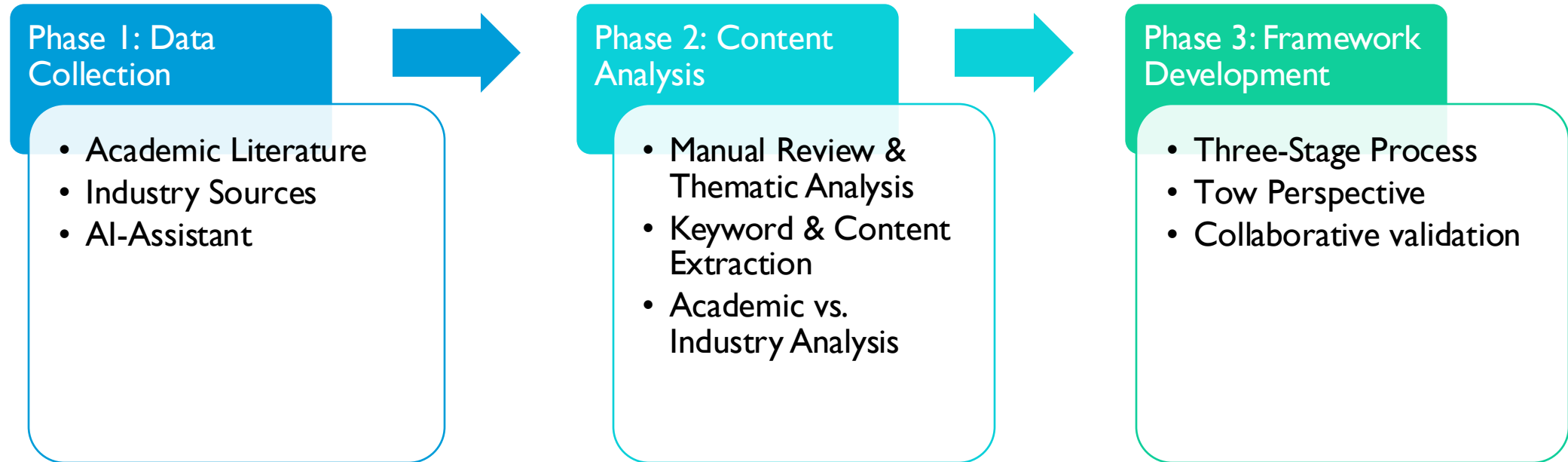
Future Research Directions

→ Development of standardized DeFi **governance frameworks** and validation methodologies

→ Automated tools for real-time governance **consistency checking**

→ Long-term studies on **governance evolution** and its impact on DeFi ecosystem stability

RQ1 – DeFi Governance Taxonomy Development Process



Validation Process

- Senior Web3 researcher lead
- Team discussions
- Regular meetings
- Consensus Building

RQ3 - Design-Implementation Consistency in DeFi

Project Selection and Data Preparation

Step 1: Project Selection Criteria

- ✓ Project must be related to DeFi
- ✓ Both whitepaper and code must be accessible
- ✓ Whitepaper has tokenomics section

Challenge: Many projects had invalid links

Step 2: Data Sources

- Code4Rena, ICODrops, ICOmarks
- Internet Archive for historical documents

Focus: Projects implemented in Solidity

Final Dataset for Analysis

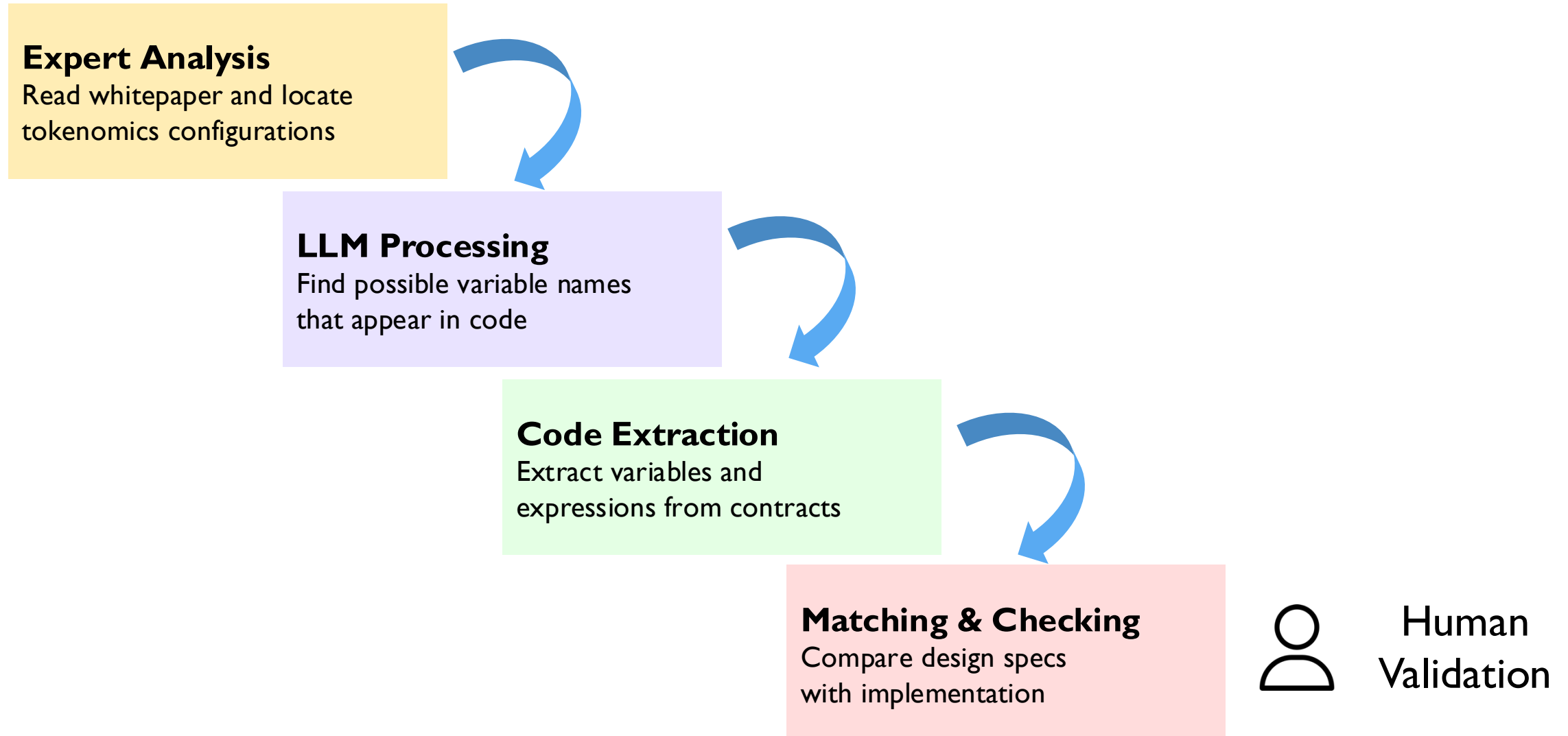
15
Projects

104 Tokenomics
Configurations

Both WP
& Code

RQ3 - Design-Implementation Consistency in DeFi

Analysis Framework



RQ3 - Design-Implementation Consistency in DeFi



Key Takeaways for RQ3

- **Widespread problem:** 87% of projects (13/15) had inconsistencies
- **Common occurrence:** 26% of configurations showed design-implementation gaps
- **Trust implications:** Inconsistencies affect project credibility and user trust
- **Detection challenge:** Manual verification still needed despite automation tools
- **Industry-wide issue:** Suggests systematic problems in DeFi development practices



Critical Recommendations

- Mandatory consistency checks during development and auditing
- Automated verification tools to compare whitepapers with code
- Regular documentation updates when implementation changes
- Transparency requirements for any deviations from stated design
- Industry standards for design-implementation validation

Bottom Line: Design-implementation consistency is crucial for enhancing overall reputation and trustworthiness of DeFi projects

✨ Impact for DeFi Ecosystem Stakeholders

🔬 Researchers

- Need for DeFi governance frameworks
- Verification methodologies for governance systems
- Automated consistency checking tools

👨‍💻 Developers

- Address ownership design from early stages
- Ensure whitepaper-implementation consistency
- Focus on governance vulnerability prevention

💰 Investors & Users

- Evaluate governance structures before investing
- Check for privileged functions and centralization
- Verify tokenomics implementation consistency

⚖️ Regulators

- Monitor privileged functions and ownership
- Consider whitepaper legal significance
- Focus on governance-related fraud detection