
Collaborative Generative AI Agents for Enhanced Organizational Innovation

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Abstract.

This study proposes a Multi-Agent Generative AI Framework for organizational innovation. Multiple autonomous agents perform ideation, evaluation, domain reasoning, and strategy alignment through coordination and feedback loops. The framework reduces redundancy and bias while improving creativity, solution quality, scalability, and decision efficiency compared with single-agent and manual approaches.

Keywords. Multi-Agent Systems, Generative AI, Organizational Innovation, Autonomous Agents, AI Collaboration.

1. INTRODUCTION

Innovation is essential for organizational competitiveness, but traditional brainstorming and expert-based methods can suffer from bias, limited scalability, and knowledge silos [1,2]. Generative AI and LLMs support idea generation, reasoning, and decision-making, but single-agent systems often provide limited perspectives and repetitive solutions [3–6]. Multi-Agent Systems enable autonomous agents to collaborate and solve complex problems with greater diversity and scalability [7–9]. However, their application to organizational innovation remains limited [10]. This study proposes a Multi-Agent Generative AI Framework for collaborative ideation, evaluation, and strategic alignment.

2. RELATED WORK

2.1 Generative AI in Organizations

Generative AI enhances creativity, decision-making, automation, and productivity across organizations [11]. However, its adoption introduces challenges related to governance, trust, and knowledge sharing [13]. Existing applications mainly focus on task automation rather than collaborative innovation [9].

2.2 Multi Agent Systems (MAS)

Multi-Agent Systems use autonomous agents that cooperate or compete to solve complex problems through coordination and decentralized decision-making [4–7]. Integrating LLMs

further enhances agent reasoning and collaboration. However, existing research largely emphasizes technical coordination rather than organizational innovation.

2.3 Bridging the Gap Between Theory and Sustainable Practice:

Table 1: Organizational Innovation Challenges and Framework Contribution[9]

Challenge	Limitation	Multi-Agent Solution
Cognitive bias	Limited diverse thinking	Diverse agents generate ideas
Knowledge silos	Fragmented information	Agents share cross-functional knowledge
Limited scalability	Difficult parallel tasks	Parallel agent execution
Weak strategic alignment	Goals may be missed	Goal-driven agents align outputs
Low transparency	Unclear AI reasoning	Explainable agent decisions
Slow decisions	Time-consuming consensus	Faster parallel decision-making

2.4 Research Gap

Although GenAI and MAS research has advanced, existing studies mainly focus on single-agent systems, task automation, or agent coordination [11–15]. Limited attention has been given to Multi-Agent GenAI frameworks for organizational innovation, particularly collaborative ideation, evaluation, decision-making, and strategic alignment.

3. Proposed Multi Agent Generative AI Framework

This section proposes Multi Agent Generative AI Framework of Organizational innovation which is a hybrid of generative artificial intelligence and Multi agent system (MAS) to support the organizational innovation practices.

3.1 Framework Overview

The proposed framework is a distributed, collaborative generative system that transforms organizational inputs into innovative, strategically aligned outputs. It follows an Input–Agent Collaboration–Output pipeline, where inter-agent interaction drives innovation rather than isolated generation [9].



Figure 3.1.1: Planned Multi Agent Generative AI Framework for Organizational Innovation

Organizational inputs are assigned to domain-specific LLM agents that collaborate through a coordination layer for task allocation and iterative refinement [2,3,14]. The framework generates and ranks ideas, solutions, and strategic recommendations, while its modular architecture supports scalability and flexible agent configuration [2].

4. Application to Organizational Innovation

The sector gives evidence to the usability of the Multi Agent generative AI framework proposed on representative organizational innovation use case, as well as a comparative study with the conventional and single agent approaches.

4.1 Use Case Scenario: New Product Development

Giving to the diagram, the Multi Agent Generative Framework of New Product Development (NPD) works in a efficient and repeated process that is aimed at converting the high-level statistics of an organization into sophisticated outputs of innovations. [6]



Figure 4.1.2 Application of the Proposed Framework to New Product Development

The framework follows four stages: Input Integration, Multi-Agent Generative Core, Coordination and Feedback, and Iterative Refinement, transforming organizational inputs into refined, innovative, and strategically aligned solutions.

4.2 Multi-Agent Workflow Stages and Corresponding Evaluation Matrices

Table 2: Innovation Lifecycle Stages and Evaluation Criteria [4]

Challenge	Limitation	Multi-Agent Solution
Bias in thinking	Repetitive ideas	Diverse agents + feedback
Knowledge gaps	Isolated information	Collaborative agents
Scalability	Limited handling	Parallel execution
Goal misalignment	Not goal-driven	Goal-oriented agents
Low transparency	Unclear decisions	Explainable steps
Slow process	Time-consuming	Faster parallel decisions

4.3 Target Evaluation Metrics for Validating AI-Driven New Product Development

The providing Metrix begins a benchmarking framework to evaluate the efficiency of the **Multi Agent GenAI** model against traditional human and single agent approaches. [6]



Figure 4.3.3: Target Evaluation Metrics for Innovation Quality and Process Performance

6. Conclusion and Future Work

This paper presents a Multi-Agent Generative AI Framework that combines GenAI with multi-agent principles to improve organizational innovation through specialized creativity, analysis, evaluation, and planning agents [4,13]. Future work will focus on empirical evaluation, human-in-the-loop systems, governance, transparency, and ethical accountability. The framework can also be extended to cross-organizational innovation.

7. References

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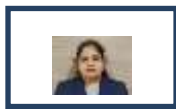
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