**🚀 4-Milestone Implementation Plan**

**Milestone 1: Core Multi-Agent Workflow (MVP)**

**Goal:** Establish the foundational **LangGraph** multi-agent system with sequential task execution.

**Deliverables:**

* Set up **LangGraph** **orchestration** with sequential agent-task workflow.
* Implement core agents:
  + News & Info Researcher (DuckDuckGo search).
  + Data Researcher (Yahoo Finance API).
  + Analyst (LLM-based synthesis).
  + Financial Expert (Buy/Hold/Sell recommendations).
* Integrate custom tools: stock price, company info, income statements.
* Produce outputs: Analysis.md + Recommendation.md.
* Basic CLI input for single stock queries.

**Success Criteria:**

* User can input a stock ticker and receive **analysis + recommendation** within 1 minute.
* Markdown files generated correctly.

**Estimated Timeline:** 3–4 weeks.

**Milestone 2: Data Quality, Context & Explainability**

**Goal:** Enhance outputs with richer data sources, formatting, and explainable insights.

**Deliverables:**

* Improve **data cleaning & validation** from Yahoo Finance API (handle missing fields, suffix issues like .NS).
* Expand **news retrieval** to include structured summaries & sentiment tagging.
* Ensure Analyst outputs are structured (valuation, risks, opportunities).
* Add **explainability layer**: reasons behind Buy/Hold/Sell in simple language.
* Logging & error handling for failed API calls.

**Success Criteria:**

* Outputs consistently contain **valuation metrics, risks, and news impact**.
* Recommendations always include **explanation of reasoning**.
* System handles invalid/missing stock symbols gracefully.

**Estimated Timeline:** 4–5 weeks.

**Milestone 3: Scalability & UI Expansion**

**Goal:** Make the system scalable and accessible to broader user groups.

**Deliverables:**

* Implement **parallel stock processing** (multi-threaded/multi-request handling).
* Build a **basic Streamlit dashboard** for non-technical users.
  + Input multiple tickers.
  + View analysis & recommendations interactively.
* Introduce **batch run mode** (portfolio-level advisory).
* Extend observability: execution time, logs, errors visible in UI.

**Success Criteria:**

* Users can analyze **multiple stocks in one run**.
* Streamlit UI allows non-technical users to interact without CLI.
* Portfolio-level output generated.

**Estimated Timeline:** 5–6 weeks.

**Milestone 4: Advanced Features & Go-to-Market Readiness**

**Goal:** Position the system for real-world usage by servicing companies, fintech partners, and advisors.

**Deliverables:**

* **New Agents/Tools**:
  + Risk Manager (stress testing, scenario modeling).
  + Compliance Checker (regulatory alignment).
  + Social Media Sentiment Analyzer (Twitter/Reddit).
* **Go-to-Market Features**:
  + API wrapper for integration with fintech apps.
  + Secure API key/token management.
  + Onboarding guide for servicing companies.
* Optimize **performance & cost control** (LLM token usage, caching).
* Prepare **demo-ready version** for potential clients.

**Success Criteria:**

* APIs available for external integration.
* Extended agents produce richer insights (risk, sentiment).
* System demo-ready for servicing companies and investors.

**Estimated Timeline:** 6–8 weeks.

**📊 Timeline Overview**

1. **Milestone 1 (MVP)** – Core multi-agent advisory workflow (3–4 weeks).
2. **Milestone 2** – Data quality, context & explainability (4–5 weeks).
3. **Milestone 3** – Scalability & UI expansion (5–6 weeks).
4. **Milestone 4** – Advanced features & GTM readiness (6–8 weeks).