# SE4002 – Fundamentals of Software Project Management

(Project Deliverable #1)

## Group Members

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# Chapter 1

# Project Lifecycle – Cross-Sell Suggestion Agent

## 1.1 Defining the Lifecycle of the Project

The project lifecycle for the Cross-Sell Suggestion Agent is structured into four distinct phases, each aligned with the five project management process groups: Initiating, Planning, Executing, Monitoring & Controlling, and Closing. This mapping ensures comprehensive coverage of all critical activities, from inception to deployment.

As illustrated in the case study from Chapter 3 of the textbook (e.g., the development of a project management intranet site), real-world projects integrate these process groups iteratively across phases. In that case, the intranet project initiated with a project charter and stakeholder buy-in, planned detailed scope and resources, executed development sprints, monitored progress against baselines, and closed with lessons learned and final approvals. Similarly, our Cross-Sell Suggestion Agent project applies this integration to build an AI-driven recommendation system, adapting the process groups to software development specifics like ML model training and API integration.

### 1.1.1 Phase 1: Project Conception and Planning

**Objectives:**

- Establish project scope and goals (boost cross-sell sales by 15%).

- Identify stakeholders and secure approvals.

- Plan resources, risks, and timeline.

  **Key Activities:**

- Project charter development and stakeholder approval.

- Requirements gathering (data inputs, target platforms, expected outputs).

- Technology stack evaluation and selection.

- Team role assignments and resource allocation.

- Initial risk identification (data quality, integration issues).

- Budget estimation and approval.

- Communication and quality management planning.

**Deliverables:**

- Project charter.

- Project management plan.

- Resource allocation plan.

- Risk register.

## 1.1.2 Phase 2: System Design and Architecture

**Objectives:**

- Develop detailed design for cross-sell suggestion engine.

- Define system architecture and database schema.

- Design UI/UX wireframes for e-commerce integration.

**Key Activities:**

- System architecture documentation.

- Data preprocessing framework and schema design.

- Recommendation algorithm design (collaborative filtering, association rules).

- API integration design for e-commerce platforms.

- UI/UX prototype creation.

- Testing strategy documentation.

**Deliverables:**

- System design document.

- Database schema specifications.

- Recommendation engine blueprint.

- API documentation.

- UI/UX wireframes.

- Testing strategy.

### 1.1.3   Phase 3: Core Development – Backend & Algorithm

**Objectives:**

- Build and train the cross-sell suggestion model.

- Implement backend systems and APIs.

- Ensure scalable and optimized data handling.

**Key Activities:**

- Data collection, preprocessing, and normalization pipeline.

- Cross-sell suggestion algorithm development and training.

- Database implementation for storing product and transaction data.

- Backend API development (recommendations, product mappings).

- Integration with ML frameworks.

- Performance optimization and benchmarking.

**Deliverables:**

- Trained cross-sell model.

- Backend APIs for recommendations.

- Optimized database schema.

- Integration-ready backend system.

- Performance reports.

### 1.1.4   Phase 4: Frontend Development and Integration

**Objectives:**

- Develop frontend for displaying recommendations.

- Integrate with backend APIs.

- Ensure responsive and user-friendly experience.

**Key Activities:**

- Frontend development for dashboards and recommendation widgets.

- Integration with backend APIs for real-time suggestions.

- Responsive design for multiple devices.

- Testing and user validation.

- Export/reporting feature for sales insights.

**Deliverables:**

- Complete frontend system.

- Integrated recommendation interface.

- Export/reporting functionality.

- Fully responsive application.

## 1.2  Mapping of Five Process Groups to Every Phase

The following tables map the five process groups to key activities in each phase.

| Process Group | Key Activities |
|---|---|
| **Phase 1: Project Conception and Planning** | |
| Initiating | Project charter approval, stakeholder analysis, high-level requirements |
| Planning | Scope definition, WBS, resource allocation, risk and communication planning |
| Executing | Team onboarding, initial meetings, proof-of-concept discussions |
| Monitoring & Controlling | Progress baseline setup, risk tracking, QA setup |
| Closing | Phase deliverables approval, lessons learned documentation |
| **Phase 2: System Design and Architecture** | |
| Initiating | Design phase kick-off, architecture review board setup |
| Planning | System design planning, database schema design, API integration strategy, UI mockups |
| Executing | Architecture documentation, prototype creation, API documentation |
| Monitoring & Controlling | Architecture validation, quality checks, milestone monitoring |
| Closing | Deliverables approval, sign-off, lessons learned |
| **Phase 3: Core Development – Backend & Algorithm** | |
| Initiating | Development environment setup, repository creation |
| Planning | Sprint planning, testing strategies, code review setup |
| Executing | Data pipeline, ML model, API endpoints, optimization |

| Process Group | Key Activities |
|---|---|
| Monitoring & Controlling | Code quality checks, performance testing, sprint tracking |
| Closing | Backend sign-off, testing completion, documentation |
| **Phase 4: Frontend Development and Integration** | |
| Initiating | Frontend dev kickoff, UI/UX team collaboration |
| Planning | Component design, sprint planning, UAT planning |
| Executing | UI implementation, integration, responsive design, export features |
| Monitoring & Controlling | UI/UX compliance checks, integration testing, performance monitoring |
| Closing | Deliverables sign-off, final approval |

Table 1.1: Process Groups Mapping

## 1.3  Lifecycle Visual Representation

Figure 1: Project Lifecycle with mapped process groups.
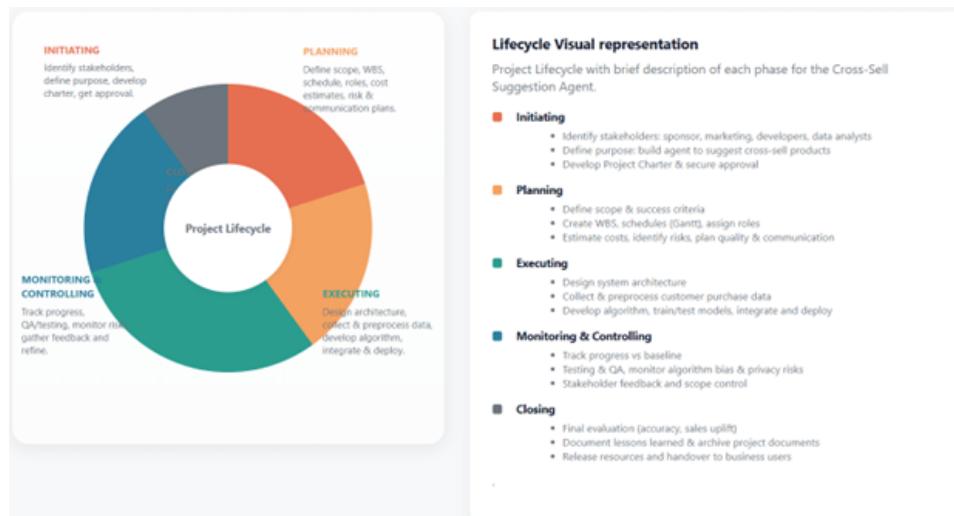


Figure 1.1: Project Lifecycle with mapped process groups.

Flowchart:
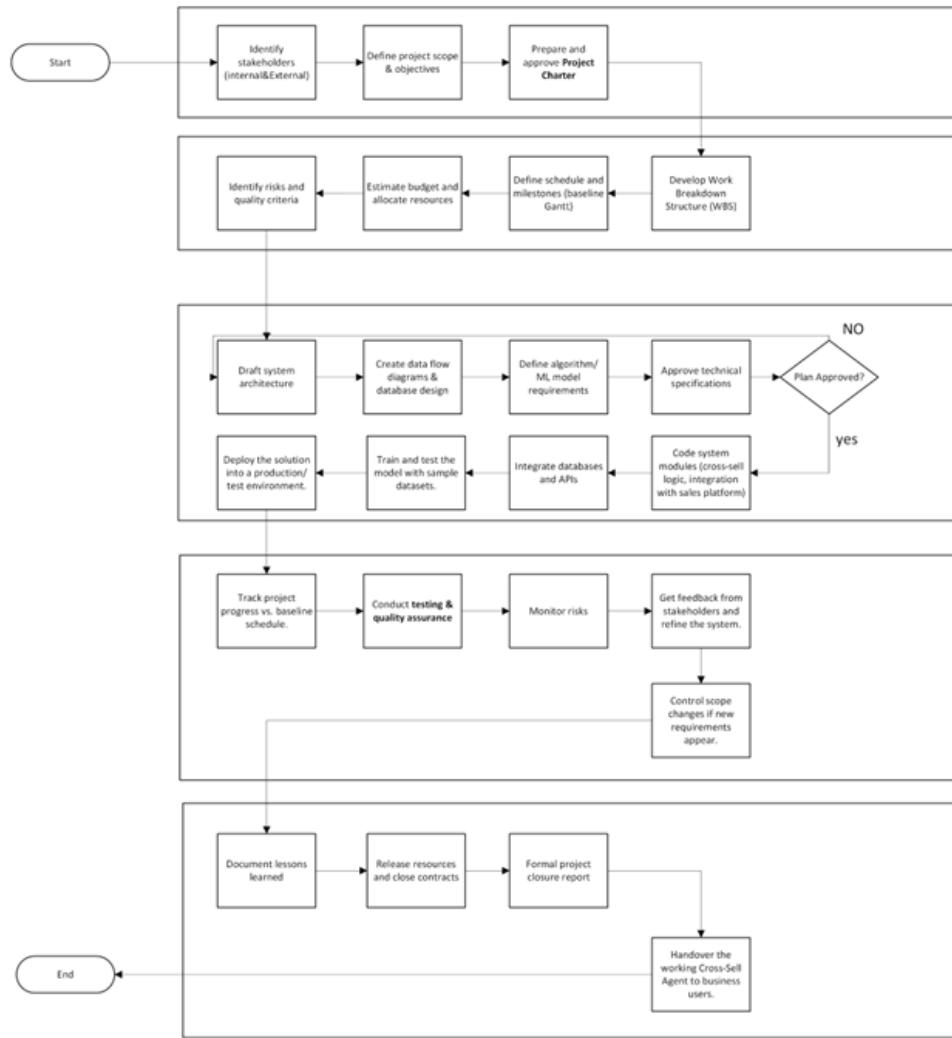
Figure 1.2: Flowchart of the Project Lifecycle.

# Chapter 2

# Gantt Chart

Figure 2: Gantt Chart illustrating project schedule (Initiating → Closing).
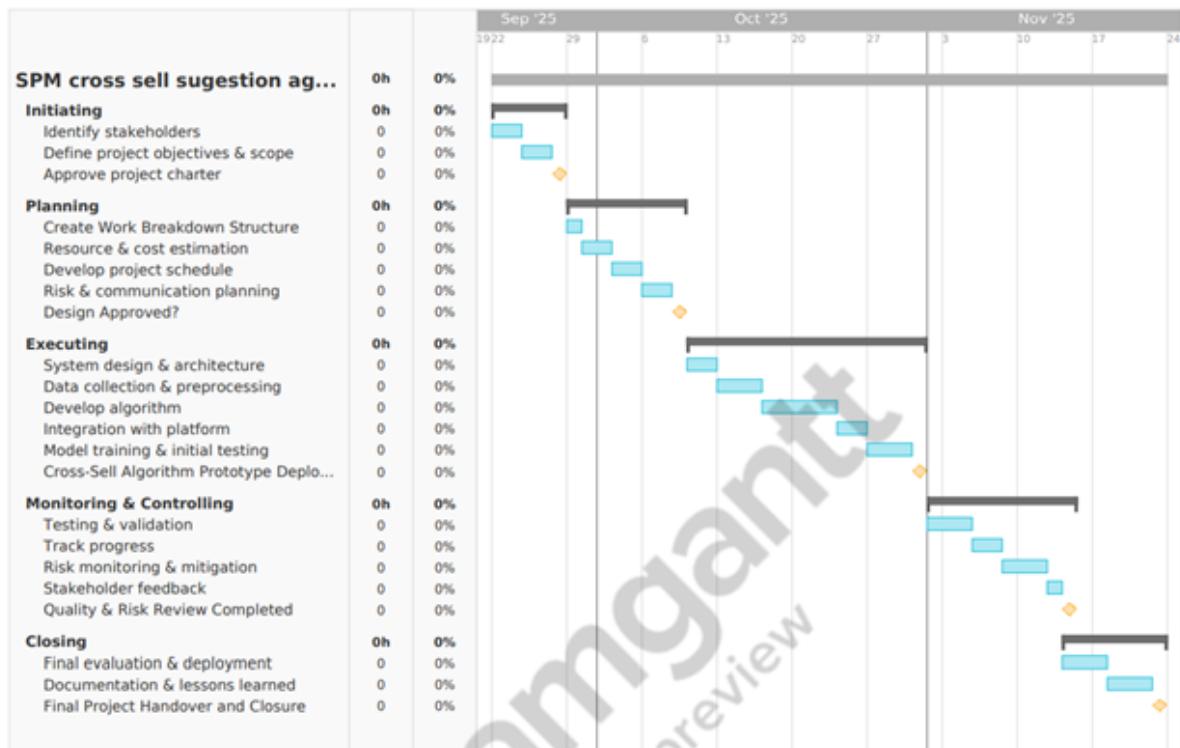


Figure 2.1: Gantt Chart illustrating project schedule (Initiating → Closing).

# Chapter 3

# SWOT Analysis

Strengths

- Technical expertise in AI/ML.

- Innovative project with strong real-world relevance.

- Well-documented workflows and clear objectives.

- Hands-on practice with ML-based recommendation systems.

Weaknesses

- Limited real-world dataset experience.

- Dependence on clean data.

- Scalability concerns for larger deployments.

- Uneven familiarity with project management tools.

Opportunities

- High demand for AI-driven personalization.

- Learning and career growth opportunity.

- Scalability into retail, banking, and insurance.

- Academic recognition.

Threats

- Data privacy and security risks.

- Competition with existing solutions (Amazon, Shopify).

- Limited resources for large-scale ML training.

- Risk of scope creep.

Mind Map:
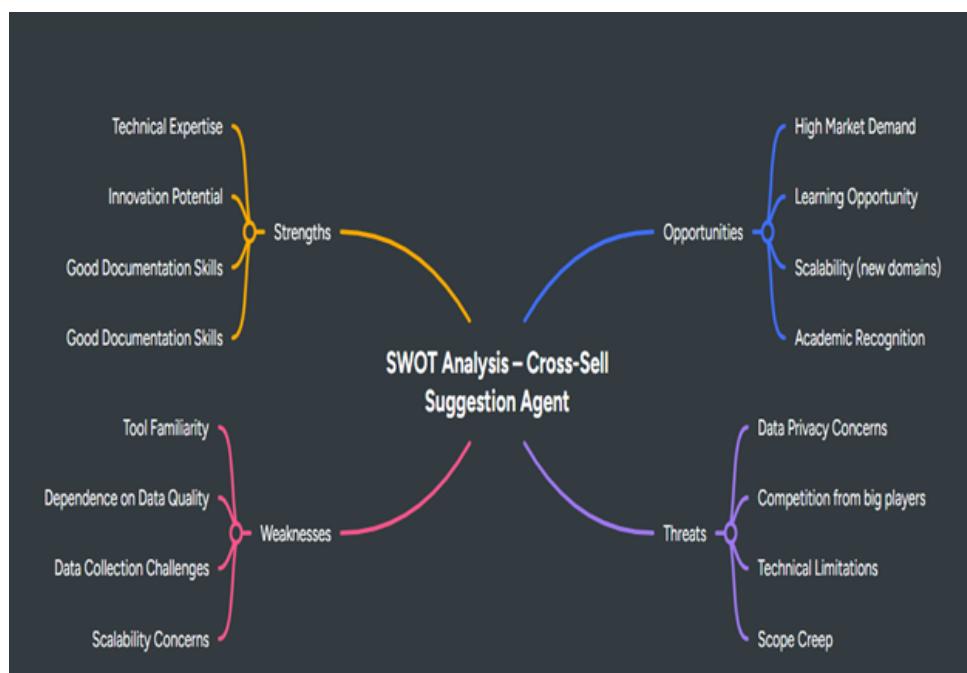
Figure 3.1: SWOT Mind Map for the Project.

# Chapter 4

# Project Charter

**Project Title:** Cross-Sell Suggestion Agent
**Date of Authorization:** September 19, 2025
**Start Date:** September 24, 2025
**Finish Date:** November 30, 2025
**Key Milestones:**

- Stakeholder analysis & charter approval – Sep 29

- Data collection & preprocessing – Oct 10

- Algorithm development & integration – Oct 25

- Testing & validation – Nov 15

- Deployment & closure – Nov 30

**Budget Information:**

- Total Budget: $5,500

- Development Tools & Libraries – $700

- Cloud Hosting & Database – $1,200

- ML Training & Testing – $1,400

- QA & Validation – $800

- Documentation & Deployment – $400

- Team Resources – $1,000

**Project Manager:** Awaiz Ali Khan (22I-2509) – Project Manager
i222509@nu.edu.pk
**Project Objectives:**

- Build an AI-driven system to suggest relevant cross-sell products.

- Improve customer satisfaction and engagement.

- Increase sales by at least 15%.

- Provide a scalable solution integrated with e-commerce platforms.

**Success Criteria:**

- 80%+ accuracy in product relevance.

- 75%+ adoption among stakeholders.

- Measurable 15% uplift in sales.

- Delivered on time, within budget, and well-documented.

- 85%+ positive stakeholder feedback.

**Approach:**

- Phase-gate project lifecycle.

- Agile sprints for development and integration.

- Weekly reviews, daily standups.

- Continuous integration and testing.

**Roles & Responsibilities:**

| Name | Role | Position | Contact |
|------|------|----------|---------|
| Behjat Zuhaira | Evaluator | Course Instructor | behjat.zuhaira@nu.edu.pk |
| Awaiz Ali Khan (22I-2509) | Project Manager | Manager | i222509@nu.edu.pk |
| Zain ul Abideen (22I-2738) | Team Member | Data/ML Developer | i222738@nu.edu.pk |
| Kamran Ali (22I-2589) | Team Member | Backend Developer | i222589@nu.edu.pk |
| Collaborator (TBD) | Collaborator | UI/Integration Support | TBD |
| Sponsor (TBD) | Project Sponsor | Business Stakeholder | TBD |
| End User (TBD) | End User | E-commerce Manager | TBD |

Table 4.1: Roles and Responsibilities

**Sign Off:**

- Awaiz Ali Khan

- Zain ul Abideen

- Kamran Ali

- Behjat Zuhaira

**Comments:**

- "This project will demonstrate the potential of AI in driving sales growth." (Awaiz)

- "Accurate data preprocessing and algorithm design are my top focus." (Zain)

- "System integration and backend stability will be ensured." (Kamran)