PROJECT MANAGEMENT

Workbook

2025

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Professor Name: NONE

Sales Forecasting System is an AI-powered predictive analytics solution developed to transform retail operations by making them more efficient, data-driven, and customer-centric. The project focuses on building accurate sales forecasting capabilities using advanced machine learning, time-series models, and historical sales data. It aims to reduce inventory costs, support strategic planning, and enable smarter business decisions across marketing, procurement, and financial domains.

Project Description

The *Sales Forecasting System* aims to assist a retail electronics company in accurately forecasting future sales. This will help the company make smarter business decisions, especially in inventory management, marketing campaigns, procurement, and financial planning. Fluctuations in demand due to seasonality and market competition are currently creating inefficiencies such as stockouts or overstocking.

By using historical sales data and modern machine learning models, this system will offer insights that reduce costs, boost sales, and enhance customer satisfaction.

Project Objectives

1. **Predict Sales Accurately**: Develop machine learning models to forecast future sales trends for various product categories.
2. **Analyze Patterns**: Identify and leverage seasonal, regional, and behavioral patterns in historical sales.
3. **Optimize Inventory**: Help reduce inventory holding costs and avoid lost sales due to stockouts.
4. **Support Marketing**: Empower the marketing team with sales predictions to plan effective campaigns.

Improve Decision-Making: Equip managers with visual dashboards and reports for data-driven strategies

PART B

Initiating Process Group

Introduces you to two PMBOK Processes

a) Create Charter
b) Identify Stakeholders

2.1. **PROJECT CHARTER**

PROJECT TITLE	SALES FORECASTING SYSTEM
ORGANIZATION	RETAIL ELECTRONICS COMPANY
START DATE	01 JULY 2025
END DATE	31 DECEMBER 2025
PROJECT CHAMPION	ANIL REDDY (VP – Strategy)

ACCURATE SALES PREDICTION IS CRITICAL FOR THE SUCCESS OF ANY RETAIL ORGANIZATION. FLUCTUATIONS IN DEMAND DUE TO SEASONALITY AND COMPETITION OFTEN CAUSE STOCKOUTS OR OVERSTOCKING, RESULTING IN CUSTOMER DISSATISFACTION AND FINANCIAL LOSSES. THIS PROJECT IS DESIGNED TO DEVELOP AN AI-POWERED SALES FORECASTING SYSTEM THAT USES HISTORICAL DATA, TIME-SERIES MODELS, AND MACHINE LEARNING TECHNIQUES TO GENERATE RELIABLE FORECASTS.

THE SYSTEM WILL HELP IN MAKING INFORMED DECISIONS ABOUT PROCUREMENT, INVENTORY MANAGEMENT, MARKETING CAMPAIGNS, AND BUDGETING. THIS PROJECT AIMS TO AUTOMATE THE FORECASTING PROCESS, PROVIDE REAL-TIME ANALYTICS, AND IMPROVE OPERATIONAL EFFICIENCY AND CUSTOMER SATISFACTION.

THIS FORMS A SMART AND PROACTIVE WAY OF HANDLING SALES STRATEGY AND BUSINESS PLANNING IN A

COMPETITIVE RETAIL LANDSCAPE.

JUSTIFICATION:

THE SYSTEM REDUCES FORECASTING ERRORS, SAVES COSTS, AND HELPS ENSURE BETTER INVENTORY AND MARKETING ALIGNMENT, IMPROVING THE COMPANY'S OVERALL DECISION-MAKING.

HIGH-LEVEL REQUIREMENTS:

HISTORICAL SALES DATA FROM PAST 5 YEARS

SKILLED PERSONNEL IN MACHINE LEARNING AND DATA ANALYSIS

TOOLS SUCH AS PYTHON, SCIKIT-LEARN, TABLEAU/POWER BI

CLOUD PLATFORM FOR MODEL DEPLOYMENT

SUCCESS CRITERIA & WHO MEASURES IT:

FORECAST ACCURACY WITHIN 10% ERROR – MEASURED BY DATA SCIENCE LEAD

ADOPTION OF DASHBOARDS BY BUSINESS TEAMS – MEASURED BY MARKETING/OPERATIONS HEADS

PROJECT DEPLOYMENT WITHIN TIMELINE – TRACKED BY PROJECT MANAGER

STAKEHOLDER LIST: COMPANY LEADERSHIP, DATA SCIENCE TEAM, MARKETING AND INVENTORY TEAMS, SUPPLIERS, CUSTOMERS (INDIRECT BENEFIT)

PROJECT BUDGET: ₹3,10,000/- INR

ASSIGNED PROJECT MANAGER	Ravi Teja
REPORTS TO	CTO
RESPONSIBILITY & AUTHORITY	Project budget, team hiring, and all deliverables

SIGNATURES: **CTO – RETAIL ELECTRONICS COMPANY**

RAVI TEJA – PROJECT MANAGER

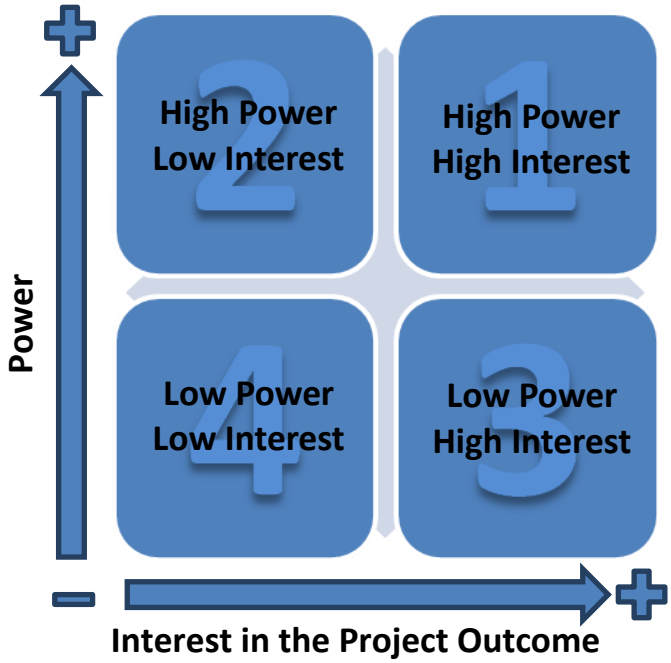
2.2. STAKEHOLDERS

Stakeholder	Role
Company Leadership	Key Decision Makers
Data Science Team	Model Development & Evaluation
Marketing Team	Uses Forecasts for Campaign Planning
Inventory Team	Stock Management Based on Forecasts
Customers	Indirect Beneficiaries

How to Rank the Stakeholders?

In determining the rank of the stakeholders, use the following approach. Identify stakeholders that have substantial interest in the outcome of the project and have substantial power to help achieve the project goals.

a. High Power and High Interest in Project Outcome: **Anil Reddy** (VP – Strategy / Project Champion)
b. High Power but Low Interest in Project Outcome: **Suppliers** (Align with forecasts but less directly involved)
c. Low Power but High Interest in Project Outcome: **Marketing Team** (Actively uses forecasts for campaign decisions)
d. Low Power and Low Interest in Project Outcome: **Customers** (Indirect beneficiaries of accurate forecasts)


2
High Power
Low Interest
1
High Power
High Interest
4
Low Power
Low Interest
3
Low Power
High Interest
Power
Interest in the Project Outcome

2.3. STAKEHOLDERS REGISTER & MANAGEMENT STRATEGY

Stakeholder	Stakeholder Rank (High/Med/Low)	Role	Goal (Interest or outcome for the Stakeholder)
Anil Reddy	**High Power and High Interest**	Project Champion / VP – Strategy	Funds and champions the project, defines goals, communicates the vision, and ensures strategic alignment.
Suppliers	**High Power but Low Interest**	Supply Partners	Align supply with forecast trends; informed to avoid over/under production.
Marketing Team	**Low Power but High Interest**	Campaign Planning	Uses forecast data to plan and optimize marketing strategies effectively.
Inventory Team	**Low Power but High Interest**	Stock Management	Relies on accurate forecasts to manage inventory levels efficiently.
Customers	**Low Power and Low Interest**	Indirect Beneficiaries	Benefit from better product availability and overall customer service.

Planning Process Group

Collect Requirements Process

Requirement Document

Category	Requirement	Stakeholder	Acceptance Criteria
Funding	Budget allocation and timely release for all project phases	Company Leadership	100%
Technical Data	Access to historical sales data (minimum 5 years)	Data Science Team	85%
Location Finalization	Setup of cloud environment and deployment infrastructure	IT/Deployment Manager	75%
Execution of Project	Support and collaboration from marketing and inventory teams	Project manager	100%
Commissioning	Approval of final model and dashboard	Anil Reddy (VP – Strategy)	90%

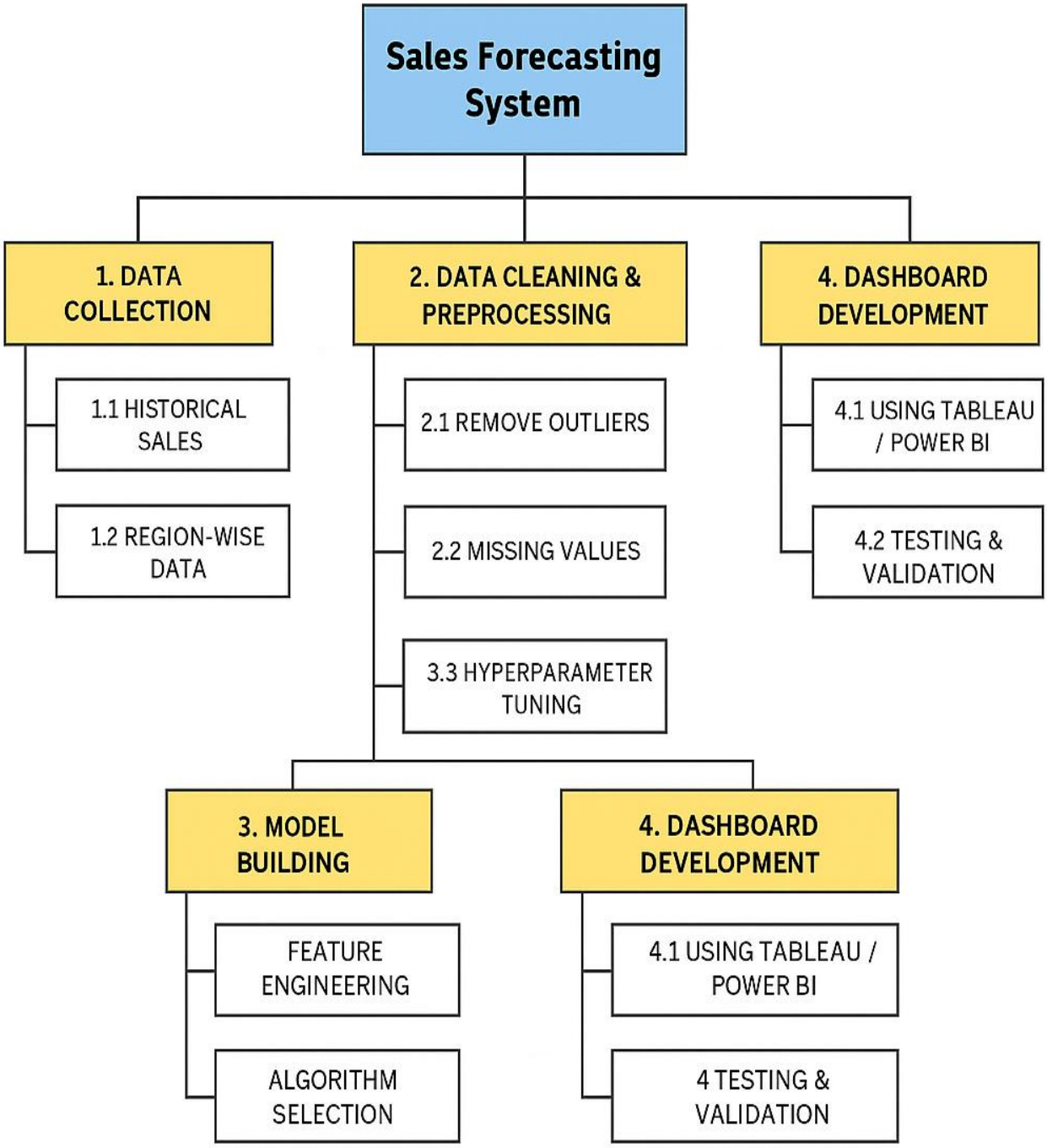
2.4. PROJECT SCOPE STATEMENT

PROJECT OBJECTIVE
DELIVERABLES
The system is an efficient solution for predicting sales trends across various product categories and requires minimal manual intervention once deployed. Completing this project aims to overcome challenges in demand forecasting and promotes optimized inventory management, enabling continuous business flow and informed decision-making across departments.
TECHNICAL REQUIREMENTS
• Historical sales dataset (minimum 5 years) • Historical sales dataset (minimum 5 years) • Scikit-learn and Pandas libraries • Time-series algorithms (e.g., ARIMA, LSTM) • Cloud platform for model deployment (e.g., AWS, Azure) • Tableau or Power BI for dashboard creation • Jupyter Notebook or IDE for development • Data preprocessing tools (handling missing data, outliers) • Git for version control • API integration for real-time data (optional in Phase 2)
LIMITS AND EXCLUSIONS (Constraints)
• The system is designed to be lightweight and modular, allowing easy integration with existing analytics workflows. • It operates with minimal computational resources and low deployment cost, making it accessible for mid-sized retail businesses. • However, in **Phase 1**, it does **not include ERP system integration** or real-time data streaming. • Maintenance involves regular model retraining and data updates but remains simple and cost-effective.
RISKS
• Inaccurate forecasts due to data inconsistencies or missing values • Model drift over time affecting prediction quality • Limited data availability for certain regions or product categories • Overfitting during training may reduce generalizability • Resistance from teams in adopting new system or dashboard tools
ACCEPTANCE CRITERIA
Stakeholders should be satisfied with the accuracy and efficiency of the forecasting system. **The model must achieve a minimum of 90% forecast accuracy based on test data.**

Signatures

Anil Reddy	**Ravi Teja**
Project Champion – VP, Strategy	
Retail Electronics Company	Project Manager

2.5. WORK BREAKDOWN STRUCTURE (WBS)



3.

2.1.

2.6 MILESTONE

2.2. **DEFINE AND ESTIMATE ACTIVITIES AND RESOURCES**

Activity List

Activities	Effort	Resource
Data Collection	medium	Data Engineers
Data Preprocessing	high	Data Scientists
Model Development	High	Machine Learning Engineers
Dashboard Design	Medium	Frontend Developers
Deployment	Medium	IT Team

2.3. **ACTIVITY DURATIONS**

Activity Durations

Activity	Duration (days)
Requirement Gathering	5
Data Collection	10
Data Preprocessing	10
Model Development	15
Dashboard Design	6
Deployment & Testing	9

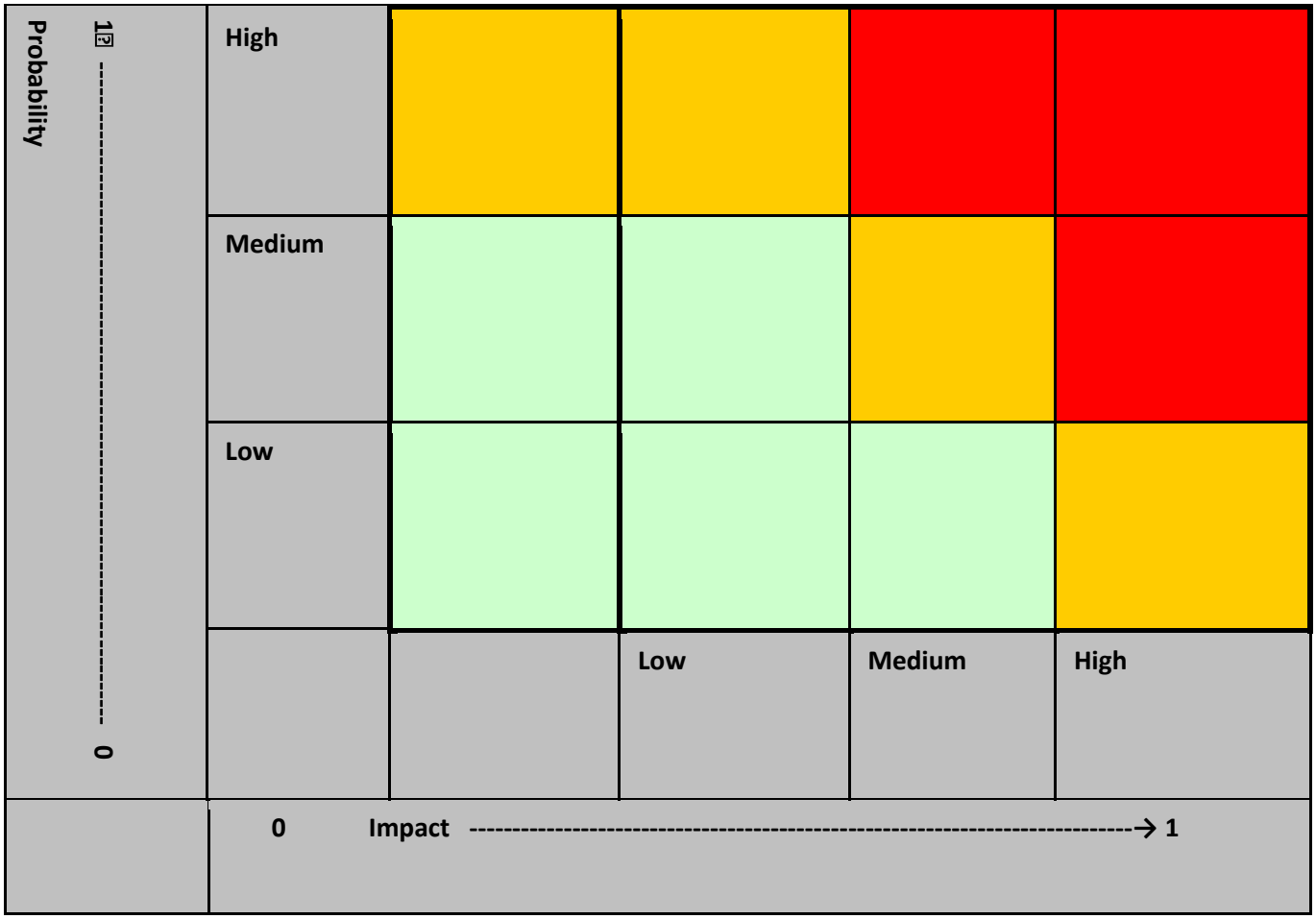
2.4. DELIVERABLES LIST BY TEAM

An alternate Way to view the activity list is to view it by resource

Team (Work Resource)	Activities (List Key deliverables only)
Team 1	1. Data Collection 2. Data Preprocessing
Team 2	3. Model Development 4. Dashboard Design & Deployment

2.5. PLAN RISK MANAGEMENT

Risk	Type of Risk (Good or Bad (threat)	Consequence or Impact
Forecast inaccuracy	Bad	Poor business decisions, loss of revenue
Model performance degradation	Bad	Affects stakeholder trust and usability
Data inconsistency or loss	Bad	Retraining delays and inaccurate results
Tool or platform failure	Bad	Interrupts deployment and dashboard access
High maintenance of cloud services	Bad	Increases operational costs


Probability
1
0
High
Medium
Low
Low
Medium
High
0
Impact
1

2.6. PLAN QUALITY MANAGEMENT

Plan Quality

Quality Roles and Responsibilities

Role	Responsibility
Project Manager	To oversee project execution, timelines, and quality assurance
Data Scientist	To ensure accuracy and performance of the prediction models
Dashboard Developer	To maintain usability, clarity, and visual effectiveness of the dashboards
IT/Deployment Lead	To ensure smooth and reliable deployment of the system
Marketing & Inventory Teams	To validate forecast usefulness and provide feedback for improvements

2.7. QUALITY MANAGEMENT PLAN

Summarizes the previous Section

Quality Management Plan

Project Title:	**Version:**	**Date:**

Overview:
Quality is a critical aspect of this project. The accuracy of forecasts, the performance of machine learning models, and the usability of dashboards will all be assessed and monitored. The project manager and data science team will ensure that all deliverables meet the defined standards for functionality and effectiveness.

Quality Responsibilities and Quality Roles: Quality is monitored by the Project Manager (Ravi Teja) and the Data Science Lead. Their responsibilities include overseeing model accuracy, system integration, and ensuring stakeholder satisfaction through continuous validation.

Quality Assurance Approach: We assure quality in our forecasting solution through rigorous model evaluation using metrics like MAE, RMSE, and backtesting techniques, along with regular stakeholder reviews and feedback cycles.

Quality Control Approach:
Each phase of the project—including data collection, model development, and dashboard creation—is subject to regular quality checks. Model outputs are validated through test data, and dashboards are reviewed for accuracy and clarity before deployment.

Quality Reporting Plan:
Performance metrics (e.g., forecast accuracy, RMSE) are reported weekly. Any model drift or performance deviation triggers an immediate review and adjustment. Regular updates are shared with stakeholders to ensure alignment with project goals.

2.8. DEVELOP HUMAN RESOURCES PLAN

Human Resources Plan

Project Title: **Version:** **Date:**

Roles and Responsibilities:

1) **Project Manager – Oversees execution, manages team coordination and deliverables**
2) **Data Engineers – Responsible for collecting, cleaning, and structuring historical sales data**
3) **Data Scientists – Develop and tune machine learning models**
4) **Dashboard Developers – Create user-friendly, interactive dashboards for stakeholders**
5) **IT Team – Handle deployment, maintenance, and system uptime**

Staff Acquisition:

Team members will be selected based on their experience in data analytics, machine learning, and dashboard design. Internal resources will be utilized primarily, with external hires if necessary.

Staff Release:

Staff will be released upon completion of their respective phases (e.g., data engineers after preprocessing, developers after dashboard handoff), with proper documentation and handover.

Training:

Training is provided by the organization on required tools such as Python, Tableau, and cloud platforms. The team is expected to maintain a professional and solution-oriented approach throughout the project.

Performance Reviews:

Performance will be reviewed by Ravi Teja (Project Manager) at regular intervals. Feedback will be provided and improvements implemented to ensure reliability and efficiency of service delivery.

Regulation and Policy Compliance:

All team members will adhere to company policies, data privacy laws, and ethical AI practices as per organizational standards and government regulations.

Item description

1	**Hardware and Software Resources** • High-performance computers or servers for model training • Development tools (e.g., Jupyter Notebook, VS Code) • Cloud computing platforms (e.g., AWS, Azure)
2	**Software Libraries and Tools** • Python (with Pandas, NumPy, Scikit-learn) • Time-series modeling tools (e.g., ARIMA, LSTM frameworks) • Tableau / Power BI for dashboard design

Note:

2.9. COMMUNICATION MANAGEMENT PLAN

Communication Management Plan

Message	Description (What is it about?)	Report to	Method (How are you communicating?)	Frequency (When and how Frequently?)	Sender (Who is sending it?)
venue					
Food menu & Catering					
Decoration, Styling & Makeup					
Sound & Florist					
Budget & progress					

2.10. COST ESTIMATION

2.11. PROJECT SUMMARY

Now that we have completed the project plan you can summarize the details such as:

Performance Indicator	Planned
Total Effort	1440 Hr
Total Duration	60 Days
Start Date	01 January 2025
End Date	31 May 2025
Cost	₹3,10,000/-

2.12. RISK MONITORING AND CONTROL

Updated Risk Register

Risk ID	Risk	Risk Response	Resource Responsible for Mitigation	Current Risk Status
1	Over Budget	To maintain the costs within the limit	Ravi Teja (Project Manager)	Within lmits
2	Timeline Delay	To complete all project phases within scheduled time	Team Leads & Project Manager	All phases on track

2.13. PROJECT CHANGE CONTROL

There was an issue with the decoration. The theme is finalised and the decoration has been started but the family didnot like the pattern so we needed to react and change it asap and we finally made some changes to the decoration and the loss is also not much.

a.We changed the pattern of the operations since the family needed a italian type of wedding

b.We changed the stylist colaborated with oue company as per groom's reqirement

2.14. LESSONS LEARNED

Phase	What Worked?	What Did not Work?	Lessons for Next Project.
Initiation Phase	Vemdpr services	Cleaning	Direct presentation to the people
Planning Phase	Venue and media	Time	To have a fixed timetable for each activity
Execution Phase	All	Filtration	Enquire about the correct number of people to attend the work