PROJECT REPORT

ON

"AI-Powered SCM Product Comparison & Replacement Advisory Agent"

FOR

ACSE SOLUTIONS

BY

Vaishnavi Tapasvi

UNIVERSITY OF PUNE

MASTER IN COMPUTER APPLICATION

Maharashtra Education Society's

INSTITUTE OF MANGEMENT
AND CAREER COURSES
(IMCC), PUNE-411038

Certificate from college

MAHARASHTRA EDUCATION SOCIETY'S

INSTITUTE OF MANAGEMENT & CAREER COURSES (IMCC)
(AUTONOMOUS)

Approved by AICTE and Recognized by Savitribai Phule Pune University, Pune
IMCC Campus, 131, Mayur Colony, Kothrud, Pune 411038, Maharashtra, India | Ph.: 020 2546 6271 / 73 | e-mail: info.imcc@mespune.in | https://imcc.mespune.in

NAAC Accredited with Grade A+

Ref. No. MES IMCC /442/2025-26 **Date:06/05/2026**

CERTIFICATE

This is to certify that the Project Report entitled

"AI-Powered SCM Product Comparison & Replacement Advisory Agent"

is prepared by

Vaishnavi Tapasvi

M.C.A. Semester IV Course for the Academic Year 2025-26 at M.E. Society's Institute of Management & Career Courses (IMCC), Pune - 411038. M.C.A Course is autonomous and affiliated to Savitribai Phule Pune University.

To the best of our knowledge, this is an original study done by the said student and important sources used by him/her have been duly acknowledged in this report.

The report is submitted in partial fulfillment of M.C.A Course for the Academic Year 2025-26 as per the rules and prescribed guidelines of Savitribai Phule Pune University.

Dr Shilpa Parlikar
Project Coordinator

Ms. Manasi Shirurkar
Programme Coordinator

Dr. Ravikant Zirmite
Head, Dept of MCA MES IMCC

Dr. Santosh Deshpande
Director, MES IMCC

External Examiner

Company Certificate



ACSE SOLUTIONS

+91 98207 40125
info@acsesolutions.com
www.acsesolutions.com

PROJECT CERTIFICATE OF ONGOING INTERNSHIP

This is to certify that **Vaishnavi Tapasvi**, a student at **MES Institute of Management and Career Courses, Pune**, has been successfully pursuing her project internship at **ACSE DIGI TECH PVT LTD** since **2nd February 2026.**

She is currently working on the project titled: **"Develop an AI-powered SCM Product Comparison and Replacement Advisory Agent "**

This certificate is issued to confirm that her project work is currently **In-Progress**. During the course of this internship, she has demonstrated a professional approach and has adhered to all organizational protocols, operational standards, and confidentiality requirements.

As per the terms of engagement, the final **Certificate of Internship** will be issued upon the successful conclusion of the tenure on **02-August-2026,** following the submission of the final project report.

With regards,
For **ACSE DIGI-TECH INDIA PRIVATE LIMITED**

Director
Kaushik Kansara

ACSE DIGI-TECH INDIA PRIVATE LIMITED
Regd. Office: A-301, Govind Villa, Rama Govind CHS, Kala Hanuman Road, Virar East - 401 305. MH. India.
Work Office: B-12, 2nd Floor, Baner Biz Bay, Near Croma Showroom,
Laxman Nagar, Baner, Pune, Maharashtra 411045, India.

Certificate from Guide

Maharashtra Education Society's

nstitute of Management and Career Courses (IMCC), Pune

AUTONOMOUS

A+ NAAC

[CGPA-3.32] In Cyc

CERTIFICATE

This is to certify that Vaishnavi Tapasvi has completed the project work entitled ***"AI-Powered SCM Product Comparison and Replacement Advisory Agent"*** under my guidance. The report is submitted in partial fulfillment of M.C.A. Course for the Academic Year 2025-2026 as per the rules & prescribed guidelines.

His/her work is found to be satisfactory and complete in all respects.

Date: 09 May 2026

Mrs. Manasi Shirurkar
(Internal Project Guide)

Acknowledgement

I take this opportunity to express my sincere gratitude to **Maharashtra Education Society's Institute of Management and Career Courses (IMCC), Pune** for providing me with the platform to undertake my internship project titled *"**AI-Powered SCM Product Comparison & Replacement Advisory Agent**"* as a part of the Master of Computer Applications (MCA) curriculum.

I would like to extend my respect to my project guide for their invaluable guidance, continuous support, and constructive feedback throughout the duration of this project. Their mentorship played a crucial role in shaping the direction and successful completion of this work.

I am especially grateful to **ACSE Solutions** for providing me with the opportunity to get exposure on enterprise supply chain processes, Oracle Fusion SCM, and agent-based AI technologies. It has significantly enhanced my technical knowledge and understanding of intelligent enterprise systems.

I also express my sincere appreciation to all the faculty members of the MCA department for their encouragement and academic support during the course of this project.

Vaishnavi Tapasvi
Student MES IMCC
Roll No: 2401198

Index

Chapter	Content	Page Number
Chapter 1	**Introduction**	
1.1	Company **Profile**	1
1.2	Problem **Statement**	1
1.3	**Objectives**	2
1.4	**Scope**	2
1.5	Use Case **Diagram**	7
1.6	Dataset Description / Knowledge **Source**	9
1.7	Agentic System **Overview**	9
Chapter 2	**Literature Review**	
2.1	2.1 Existing **Research**	12
2.2	Research Gaps	12
2.3	Agent-Based AI Systems	13
2.4	LLM Frameworks and Tools	14
Chapter 3	**Methodology**	
3.1	3.1 Data **Preprocessing**	15
3.2	3.2 Model **Selection**	15
3.3	3.3 Agent **Architecture**	15
3.4	3.4 Prompt Engineering **Strategy**	16
3.5	3.5 Memory and Context **Handling**	17
Chapter 4	**Implementation**	

4.1	4.1 System **Implementation**	17
4.2	4.2 Results and **Discussion**	18
4.3	4.3 Tool **Integration**	19
4.4	4.4 Knowledge Retrieval System (**RAG)**	19
Chapter 5	**Evaluation**	
5.1	5.1 Model **Performance**	20
5.2	5.2 Agent Task **Success Rate**	20
5.3	5.3 Response Quality **Analysis**	20
5.4	5.4 **Visualization**	21
5.5	5.5 **Insights**	27
Chapter 6	**Conclusion**	
6.1	6.1 **Summary**	27
6.2	6.2 Future **Work**	27
6.3	6.3 Limitations of the **Agent**	28
Chapter 7	**Chapter 7 – References**	
Chapter 8	**Chapter 8 – Appendices**	
Chapter 9	**Chapter 9 – Annexure**	

Chapter 1 – Introduction

1.1 Company Profile

ACSE Solutions is a customer-focused IT services and consulting company specializing in **Oracle enterprise solutions** and digital transformation. Founded in 2014 and headquartered in Columbia, Maryland, with a presence in Pune, India, ACSE delivers Oracle **ERP Cloud and On-Premise** solutions across **Finance, Supply Chain, Manufacturing, Projects, and HR**. The company helps businesses improve efficiency, reduce costs, and accelerate growth through **cloud, AI, and automation technologies** while emphasizing scalable solutions, customer satisfaction, and long-term partnerships.

1.2 Problem Statement

In enterprise environments using Oracle Fusion SCM, **product comparison** and **replacement decisions** are complex and largely manual. Users must analyze data across multiple modules—**PIM, Inventory, Procurement, Planning, and Costing**—resulting in time-consuming processes, reliance on SCM expertise, and

fragmented insights. Additionally, existing systems lack automated replacement impact analysis and explainable reasoning.

This project addresses these challenges by proposing an **AI-powered SCM advisory agent using Oracle Fusion AI Agent Studio**.

1.3 Objectives

- Develop an AI-powered SCM advisory agent using Oracle Fusion AI Agent Studio
- Enable natural language–based product comparison
- Perform replacement impact analysis across Inventory, Procurement, Planning, and Costing
- Provide structured, explainable outputs
- Ensure secure, read-only, and compliant operations

1.4 Scope

A. User Requirements

a) Functional User Requirements

1. The system shall provide an AI-based conversational assistant using Oracle Fusion AI Agent Studio to support product comparison and replacement decisions.
2. The system shall allow users to compare multiple products through natural language queries.

3. The system shall retrieve and analyze product data from Oracle Fusion SCM modules, including Product Information Management (PIM), Inventory Management, Procurement, Planning, and Costing.
4. The system shall recommend the most suitable product based on SCM attributes and lifecycle compatibility.
5. The system shall perform replacement impact analysis by evaluating effects on inventory, operations, supply chain risks, planning, and costs.
6. The AI agent shall explain recommendations in clear, business-friendly language.
7. The system shall operate in read-only mode without modifying enterprise data.
8. Access to SCM and product data shall follow Oracle Fusion role-based security policies.

b) Non-Functional User Requirements

1. The system shall generate consistent, structured, and explainable AI responses.
2. The solution shall be scalable and cloud-ready within Oracle Fusion Cloud.
3. The AI agent shall use only standard Oracle Fusion business objects without custom extensions.
4. Response time shall be near real-time for conversational queries.

B. Module Specifications

a) User Interaction & Conversational AI Module

Purpose: Handles user interaction and interprets natural language queries.

Key Functions:

- Accepts queries for product comparison and replacement.
- Identifies user intent such as comparison, replacement evaluation, and impact analysis.
- Triggers relevant AI Agent Studio tools and prompts.
- Displays structured outputs and advisory summaries.

b) Product Information Management (PIM) Analysis Module

Purpose: Retrieves and compares product master and lifecycle data.

Key Functions:

- Retrieves item number, description, item class, and UOM.
- Analyzes lifecycle phase and status.
- Validates compatibility between items.

c) Inventory Impact Analysis Module

Purpose: Analyzes inventory impact of item replacement.

Key Functions:

- Compares stockability, reservability, and ATP attributes.

- Provides inventory impact summaries for replacement decisions.

d) Procurement Impact Analysis Module

Purpose: Evaluates procurement and sourcing impact of alternate items.

Key Functions:

- Compares purchasability and sourcing attributes.
- Identifies procurement risks in replacements.
- Highlights sourcing advantages and disadvantages.

e) Planning Impact Analysis Module

Purpose: Assesses replacement impact on supply planning.

Key Functions:

- Compares planning methods and make/buy decisions.
- Identifies required planning adjustments.
- Highlights potential supply risks.

f) AI Agent Logic & Prompt Module

Purpose: Implements AI reasoning and explainability.

Key Functions:

- Applies SCM-based recommendation rules.
- Enforces lifecycle and sourcing priorities.
- Generates explainable AI outputs.

- Ensures structured response formatting.

g) Reporting & Advisory Output Module

Purpose: Presents final comparison and recommendations.

Key Functions:

- Displays side-by-side comparison tables.
- Provides business summaries and cross-module insights.
- Shows replacement impact analysis.
- Displays final recommendation with confidence level.

C. Technology to Be Used

a) Frontend

- Oracle Redwood UI
- Oracle Digital Assistant (Conversational Interface)

b) Backend / AI Platform

- Oracle Fusion AI Agent Studio
- Prompt Engineering Framework
- AI Agent Configuration and Rule Definition

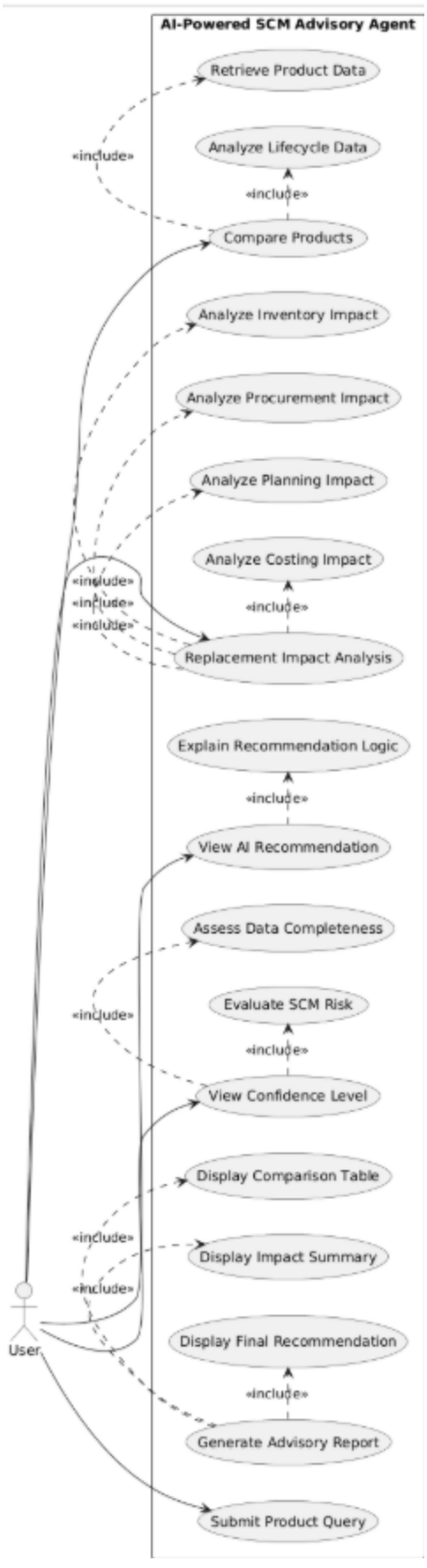
c) APIs & Business Objects

- Oracle Fusion Business Object Tools

d) Platform & Infrastructure

- Oracle Fusion Cloud Applications
- Oracle Cloud Infrastructure (OCI)

1.5 Use Case Diagram


AI-Powered SCM Advisory Agent
Retrieve Product Data
Analyze Lifecycle Data
Compare Products
Analyze Inventory Impact
Analyze Procurement Impact
Analyze Planning Impact
Analyze Costing Impact
Replacement Impact Analysis
Explain Recommendation Logic
View AI Recommendation
Assess Data Completeness
Evaluate SCM Risk
View Confidence Level
Display Comparison Table
Display Impact Summary
Display Final Recommendation
Generate Advisory Report
Submit Product Query
User
«include»

1.6 Dataset Description / Knowledge Source

The system utilizes native data from Oracle Fusion SCM.

Data Sources: PIM, Inventory, Procurement, Planning, and Costing

Access Mechanisms: Oracle Fusion Business Object Tools, REST APIs, and role-based access control

No external datasets are used.

1.7 Agentic System Overview

An agent-based architecture is preferred over traditional ML pipelines because SCM decisions are dynamic, context-driven, and require multi-step reasoning.

Limitations of Traditional ML

- Static models dependent on historical data
- Limited real-time data access
- Lack of multi-step reasoning capability
- Low explainability of results
- Difficult integration with enterprise systems

Advantages of Agent-Based Architecture using Oracle AI Agent Studio

- Dynamic decision-making based on user queries

- Real-time retrieval of SCM data
- Multi-step reasoning for comparison and replacement analysis
- Explainable outputs with insights, risks, and confidence levels
- Seamless integration across PIM, Inventory, Procurement, Planning, and Costing modules

Agent Reasoning Loop

The agent follows a structured process to convert user queries into actionable SCM recommendations.

1. **User Query:** Receives a natural language request for comparison or replacement.
2. **Intent Identification:** Understands the user's objective and required actions.
3. **Tool Planning:** Identifies the required SCM modules and tools.
4. **Tool Execution:** Fetches real-time data from enterprise systems.
5. **Data Aggregation:** Combines data from multiple SCM modules.
6. **Analysis:** Performs comparison, impact assessment, and reasoning.
7. **Recommendation:** Generates insights and risk evaluations.
8. **Response:** Displays structured outputs such as tables, summaries, and confidence levels.

This loop enables dynamic, explainable, and multi-step decision-making in Oracle Fusion SCM.

Autonomy of the Agent

The agent operates autonomously by selecting relevant tools, deciding execution flow, handling missing data, and adapting to different query types.

Its autonomy is controlled through strict rules that enforce tool execution order, validate IDs, prevent unsupported assumptions, and ensure reliable error handling without interrupting processing.

Tool Usage Strategy

The system follows a tool-first approach where all outputs are generated directly from SCM tools such as Item Details, Operational & Extended Attributes, Item Costs, and Item Class.

To ensure reliability, strict rules are enforced: no tool can be skipped, inputs cannot be empty, no assumptions are made without tool data, and tool outputs are reused consistently throughout the process.

Chapter 2 – Literature Review

2.1 Existing Research

Research in Supply Chain Management (SCM) has increasingly focused on AI-based decision support systems to improve operational efficiency and accuracy. Studies have also explored product lifecycle optimization, inventory analytics, and procurement management to enhance forecasting, stock control, and supplier performance.

Advancements in Natural Language Processing (NLP) and large language models from organizations like OpenAI and Google have enabled intelligent, conversational, and context-aware systems.

In enterprise environments, platforms such as SAP SCM and Oracle Fusion SCM support supply chain operations, but they often lack integrated AI-driven conversational advisory capabilities for real-time decision-making.

2.2 Research Gaps

Despite advancements in SCM systems and AI analytics, several gaps still exist. Most solutions lack a conversational interface, making natural language interaction and insight generation difficult.

Existing systems also provide limited cross-module analysis, restricting unified insights across inventory, procurement, and planning. In addition, many solutions lack explainability and fail to justify recommendations with clear reasoning.

These limitations highlight the need for an intelligent, conversational, and explainable SCM advisory system that integrates data across modules to support better decision-making.

2.3 Agent-Based AI Systems

Agent-based AI systems use autonomous decision-making and multi-step reasoning, making them suitable for complex domains like Supply Chain Management (SCM). Unlike traditional systems, they can interpret user queries, plan actions, and interact with multiple tools and data sources dynamically.

These systems typically include three main components:

- **Planner:** Decides the sequence of actions and selects required tools.
- **Executor:** Executes actions, retrieves data, and processes results.
- **Memory:** Maintains context across interactions for coherent and context-aware responses.

Overall, agent-based architectures support adaptive, tool-integrated, and explainable SCM advisory systems.

2.4 LLM Frameworks and Tools

In this project, the system is implemented using Oracle Fusion AI Agent Studio instead of external AI orchestration frameworks. The platform provides built-in support for enterprise-grade agentic applications through integrated tools, prompts, and real-time data access.

The mapping between general LLM frameworks and Oracle AI Agent Studio components is as follows:

Framework Concept	**Oracle Equivalent**
Tool Calling	Business Object Tools
Prompt Templates	Agent Prompts
Memory	Session Context
RAG	Real-time SCM Data Retrieval

Oracle AI Agent Studio eliminates the need for external orchestration frameworks by providing native tool integration, prompt-driven execution, and live SCM data retrieval. Unlike traditional RAG systems that depend on vector databases, this approach uses real-time enterprise SCM data to ensure accurate and up-to-date responses.

Overall, the platform enables a secure, scalable, and fully integrated agent-based SCM advisory system.

Chapter 3 – Methodology

3.1 Data Preprocessing

Data preprocessing is mainly handled within Oracle Fusion SCM, where data is already validated and structured to ensure quality and consistency.

Relevant attributes are selectively retrieved and standardized into a uniform format for accurate comparison and analysis across SCM modules. Missing or unavailable values are represented as "Data not available" to maintain completeness without making assumptions.

3.2 Model Selection

The system uses LLM-based reasoning instead of traditional machine learning models, removing the need for data training and model tuning. This enables dynamic query understanding and real-time multi-step decision-making. GPT 5 is used as LLM.

To ensure SCM accuracy, the agent applies rule-based business logic for analysis, comparison, and recommendations. The execution is prompt-driven, where structured system prompts control tool usage, reasoning flow, and response formatting to provide consistent and explainable outputs.

3.3 Agent Architecture

The system uses an agent-based architecture implemented with Oracle Fusion AI Agent Studio, where reasoning and execution are

managed through prompt-driven orchestration and tool integration.

Architecture Flow

User - Agent - Planner - Tools - Executor - Output

The process starts with a user query, which the agent interprets to identify intent. The Planner determines the required actions and tool sequence using system prompts and dependency rules.

Oracle Business Object Tools then retrieve real-time SCM data from modules such as PIM, Inventory, Procurement, and Planning. The Executor analyzes the data, performs comparisons, and applies SCM business logic to generate insights.

Finally, the system produces structured HTML outputs containing comparison tables, analysis, and recommendations. This architecture supports dynamic reasoning, real-time data access, and explainable decision-making for enterprise SCM.

3.4 Prompt Engineering Strategy

The system uses a structured prompt engineering approach within Oracle Fusion AI Agent Studio to control agent behavior, reasoning, and output formatting.

The system prompt defines the agent’s role as an SCM advisory assistant responsible for product comparison, impact analysis, and recommendation generation. Task instructions guide core

functions while enforcing rules such as mandatory tool usage, dependency-based execution, and no assumptions without data.

Prompts also control output design, ensuring responses are structured and user-friendly. The agent generates formatted outputs with comparison tables, risk summaries, and confidence levels to support explainable enterprise decision-making.

3.5 Memory and Context Handling

The system uses a session-based memory approach within Oracle Fusion AI Agent Studio to maintain context during user interactions. This allows the agent to support follow-up queries and multi-step conversations effectively.

Rather than relying on stored knowledge, the system prioritizes real-time SCM data retrieval, ensuring responses are based on the latest enterprise data and improving overall reliability and accuracy.

Chapter 4 – Implementation

4.1 System Implementation

The system is implemented using Oracle Fusion AI Agent Studio with an agent-based architecture that combines prompt-driven reasoning and enterprise tool orchestration.

The advisory agent is configured through structured system prompts that define its role, behavior, and execution logic. Business Object Tools are integrated with SCM modules such as PIM, Inventory, Procurement, and Planning to retrieve real-time enterprise data.

The architecture enables multi-step reasoning, cross-module analysis, and domain-specific decision-making. Final outputs are generated in structured HTML compatible with Oracle Redwood UI, providing clear and user-friendly comparison results, analysis, and recommendations.

4.2 Results and Discussion

The implemented system demonstrates effective performance in handling SCM advisory tasks through its agent-based architecture. It supports comprehensive product comparison by evaluating multiple item attributes and providing a unified analysis view. The agent also performs replacement impact analysis across inventory, procurement, and planning functions.

Overall, the system improves decision-making efficiency by reducing manual effort, delivering faster insights, and providing structured and explainable recommendations for enterprise users.

4.3 Tool Integration

The system integrates with Oracle Fusion SCM using Business Object Tools and REST APIs, enabling secure and real-time access to enterprise data. These tools provide an abstraction layer over databases, allowing the agent to retrieve structured data without direct database queries.

The integration supports key SCM modules such as Item Master (PIM), Inventory, Procurement, and Planning. Data retrieved from these modules is consolidated and analyzed by the agent for comparison and recommendation tasks.

This approach ensures scalable, secure, and read-only access while enabling dynamic cross-module analysis and maintaining enterprise data integrity standards.

4.4 Knowledge Retrieval System (RAG)

The system does not use a traditional RAG pipeline. Instead, it follows a tool-based retrieval approach using Oracle Fusion SCM Business Object Tools.

Data is retrieved in real time through structured API calls, where the agent fetches item, inventory, procurement, and planning details and provides them as context to the LLM for analysis and response generation.

Unlike traditional RAG systems, this approach does not use vector databases, embeddings, or semantic search. Retrieval is

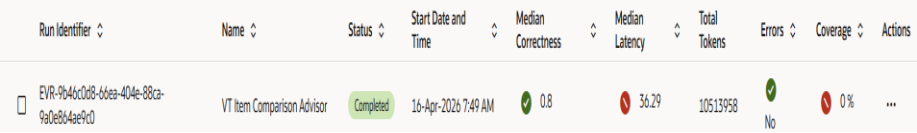
deterministic and based on explicit identifiers such as InventoryItemId.

This method ensures:

- High data accuracy from source systems
- Real-time insights
- Strong compliance with enterprise data governance standards

Chapter 5 – Evaluation

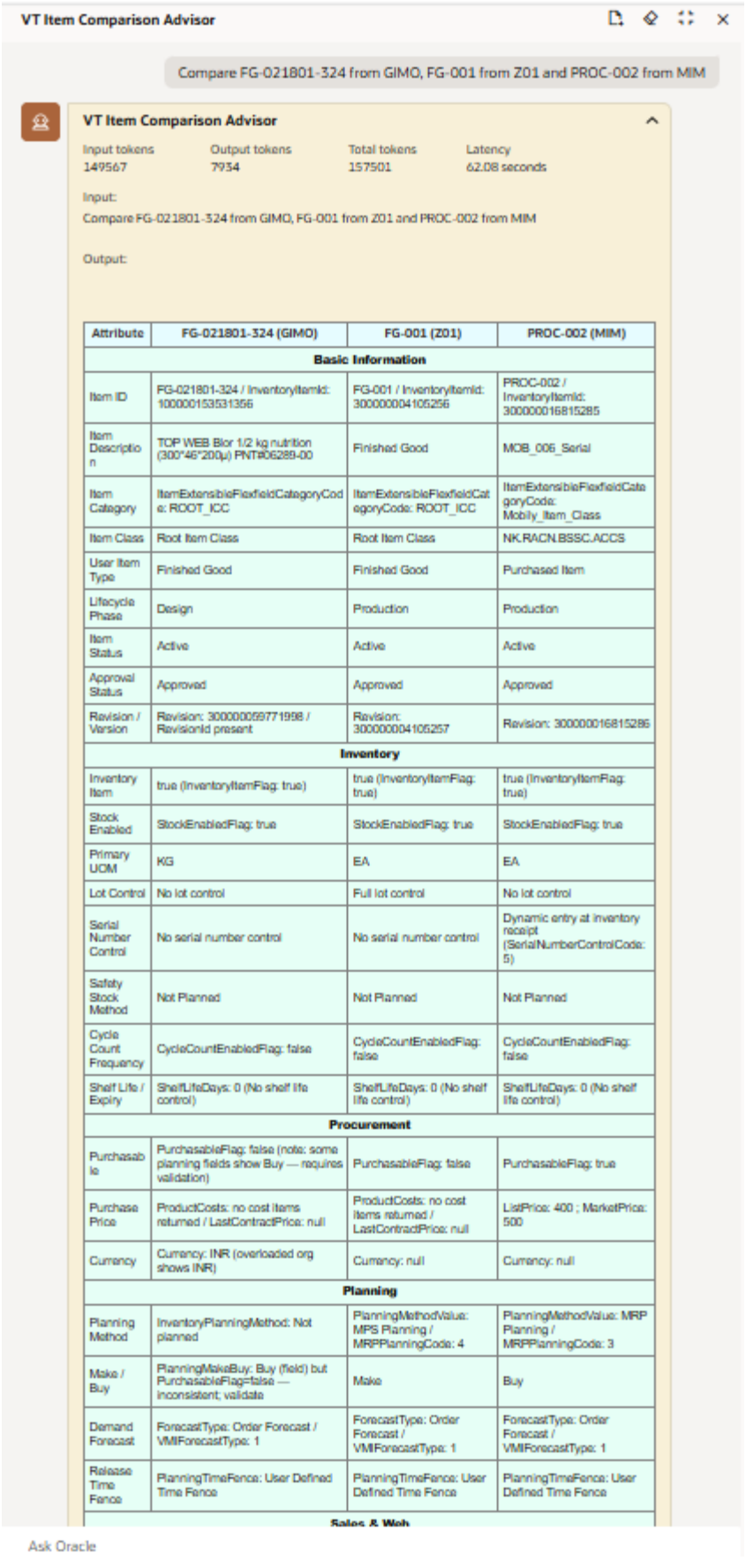
5.1 Model Performance, 5.2 Agent Task Success Rate, 5.3 Response Quality Analysis



Run Identifier	Name	Status	Start Date and Time	Median Correctness	Median Latency	Total Tokens	Errors	Coverage	Actions
EVR-9b46c0d8-66ea-404e-88ca-9a0e864ae9c0	VT Item Comparison Advisor	Completed	16-Apr-2026 7:49 AM	0.8	36.29	10513958	No	0 %	...

The model performance is good overall, with a Median Correctness score of 0.8 indicating mostly accurate responses. The agent task success rate is high since the run was completed successfully with no errors. Response quality is accurate and detailed, supported by the high token usage (1,05,13,958), but the Median Latency of 36.29 seconds indicates slower response generation. The Coverage value of 0% suggests that evaluation or test coverage was not captured or remains incomplete.

5.4 Visualization – Chatbot screen



Attribute	FG-021801-324 (GIMO)	FG-001 (Z01)	PROC-002 (MIM)
Basic Information			
Item ID	FG-021801-324 / InventoryItemId: 100000153531366	FG-001 / InventoryItemId: 300000004105256	PROC-002 / InventoryItemId: 300000016815285
Item Description	TOP WEB Blor 1/2 kg nutrition (300*46*200µ) PNT#06289-00	Finished Good	MOB_006_Serial
Item Category	ItemExtensibleFlexfieldCategoryCode: ROOT_ICC	ItemExtensibleFlexfieldCategoryCode: ROOT_ICC	ItemExtensibleFlexfieldCategoryCode: Mobily_Item_Class
Item Class	Root Item Class	Root Item Class	NK.RACN.BSSC.ACCS
User Item Type	Finished Good	Finished Good	Purchased Item
Lifecycle Phase	Design	Production	Production
Item Status	Active	Active	Active
Approval Status	Approved	Approved	Approved
Revision / Version	Revision: 300000099771998 / RevisionId present	Revision: 300000004105257	Revision: 300000016815286
Inventory			
Inventory Item	true (InventoryItemFlag: true)	true (InventoryItemFlag: true)	true (InventoryItemFlag: true)
Stock Enabled	StockEnabledFlag: true	StockEnabledFlag: true	StockEnabledFlag: true
Primary UOM	KG	EA	EA
Lot Control	No lot control	Full lot control	No lot control
Serial Number Control	No serial number control	No serial number control	Dynamic entry at inventory receipt (SerialNumberControlCode: 5)
Safety Stock Method	Not Planned	Not Planned	Not Planned
Cycle Count Frequency	CycleCountEnabledFlag: false	CycleCountEnabledFlag: false	CycleCountEnabledFlag: false
Shelf Life / Expiry	ShelfLifeDays: 0 (No shelf life control)	ShelfLifeDays: 0 (No shelf life control)	ShelfLifeDays: 0 (No shelf life control)
Procurement			
Purchasable	PurchasableFlag: false (note: some planning fields show Buy — requires validation)	PurchasableFlag: false	PurchasableFlag: true
Purchase Price	ProductCosts: no cost items returned / LastContractPrice: null	ProductCosts: no cost items returned / LastContractPrice: null	ListPrice: 400 ; MarketPrice: 500
Currency	Currency: INR (overloaded org shows INR)	Currency: null	Currency: null
Planning			
Planning Method	InventoryPlanningMethod: Not planned	PlanningMethodValue: MPS Planning / MRPPlanningCode: 4	PlanningMethodValue: MRP Planning / MRPPlanningCode: 3
Make / Buy	PlanningMakeBuy: Buy (field) but PurchasableFlag=false — inconsistent; validate	Make	Buy
Demand Forecast	ForecastType: Order Forecast / VMIForecastType: 1	ForecastType: Order Forecast / VMIForecastType: 1	ForecastType: Order Forecast / VMIForecastType: 1
Release Time Fence	PlanningTimeFence: User Defined Time Fence	PlanningTimeFence: User Defined Time Fence	PlanningTimeFence: User Defined Time Fence
Sales & Web			

VT Item Comparison Advisor

Sales & Web			
Shippable	ShippableFlag: true	ShippableFlag: true	ShippableFlag: true
Returnable	ReturnableFlag: true	ReturnableFlag: false	ReturnableFlag: false
Invoice Enabled	InvoiceEnabledFlag: true	InvoiceEnabledFlag: true	InvoiceEnabledFlag: true
Orderable on Web	OrderableOnWebFlag: false	OrderableOnWebFlag: true	OrderableOnWebFlag: true
Web Status	Unpublished	Unpublished	Unpublished
Finance			
Costing Enabled	CostingEnabledFlag: true	CostingEnabledFlag: true	CostingEnabledFlag: true
Tax Category / GST	TaxableFlag: false	TaxableFlag: true	TaxableFlag: true
Compliance			
Hazardous Material	HazardousMaterialFlag: false	HazardousMaterialFlag: true	HazardousMaterialFlag: true
Audit Information			
Created By	ajangda	gurdsingh@deloitte.ca	ajangda
Created Date	2023-11-08T05:46:37.190+00:00	2019-10-05T08:26:46.518+00:00	2021-10-16T06:42:17.841+00:00
Last Updated By	ajangda	gurdsingh@deloitte.ca	ajangda
Last Updated Date	2023-11-08T13:28:17.772+00:00	2019-10-05T08:27:32.580+00:00	2021-10-16T06:43:05.918+00:00

Business Summary

FG-001 (Z01) and PROC-002 (MIM) are production-ready and active; FG-021801-324 (GIMO) remains in Design and is not production-ready. PROC-002 is a purchased item with explicit pricing (ListPrice 400, MarketPrice 500) and PurchasableFlag=true, making it the best candidate for immediate procurement. FG-001 is the best candidate when you need a finished good in production (it has full lot control and process/recipe support). FG-021801-324 lacks lot/serial control, shows lifecycle=Design, and has inconsistent buy/make flags — it should not be used in live production or procurement until validated and moved to Production

Cross-Module Insights

- **Inventory:** FG-001 provides stronger traceability (full lot control). PROC-002 supports serial tracking on receipt. FG-021801-324 has limited traceability.
- **Procurement:** PROC-002 is ready to buy (pricing present). FG items are not clearly purchasable; FG-001 is manufactured (Make) and FG-021801-324 needs validation.
- **Planning:** FG-001 uses MPS/MRP planning suitable for production; PROC-002 is MRP-planned as a purchased component; FG-021801-324 is Not Planned (Design).
- **Costing:** Detailed product cost lines are missing for FG items; only PROC-002 shows list/market prices. Consider uploading or confirming product cost records for accurate financial decisions

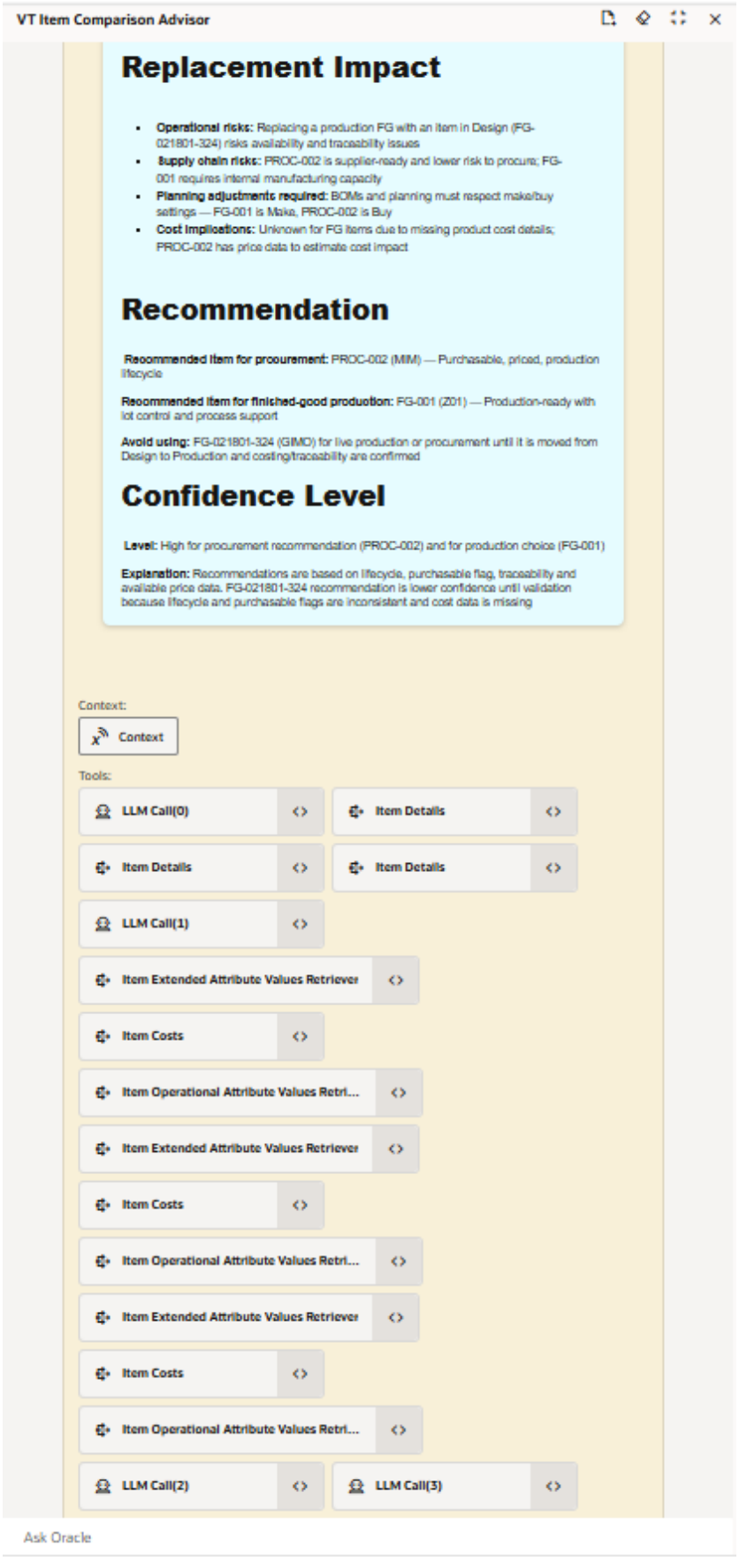
Key Differences

- Lifecycle: FG-021801-324 = Design vs FG-001 and PROC-002 = Production
- Purchasable: PROC-002 = true; FG-001 & FG-021801-324 = false (FG-021801-324 shows conflicting fields)
- Traceability: FG-001 = full lot control; PROC-002 = serial on receipt; FG-021801-324 = none
- Pricing data: only PROC-002 has explicit list/market prices

Replacement Impact

- **Operational risks:** Replacing a production FG with an item in Design (FG-021801-324) risks availability and traceability issues
- **Supply chain risks:** PROC-002 is supplier-ready and lower risk to procure; FG-

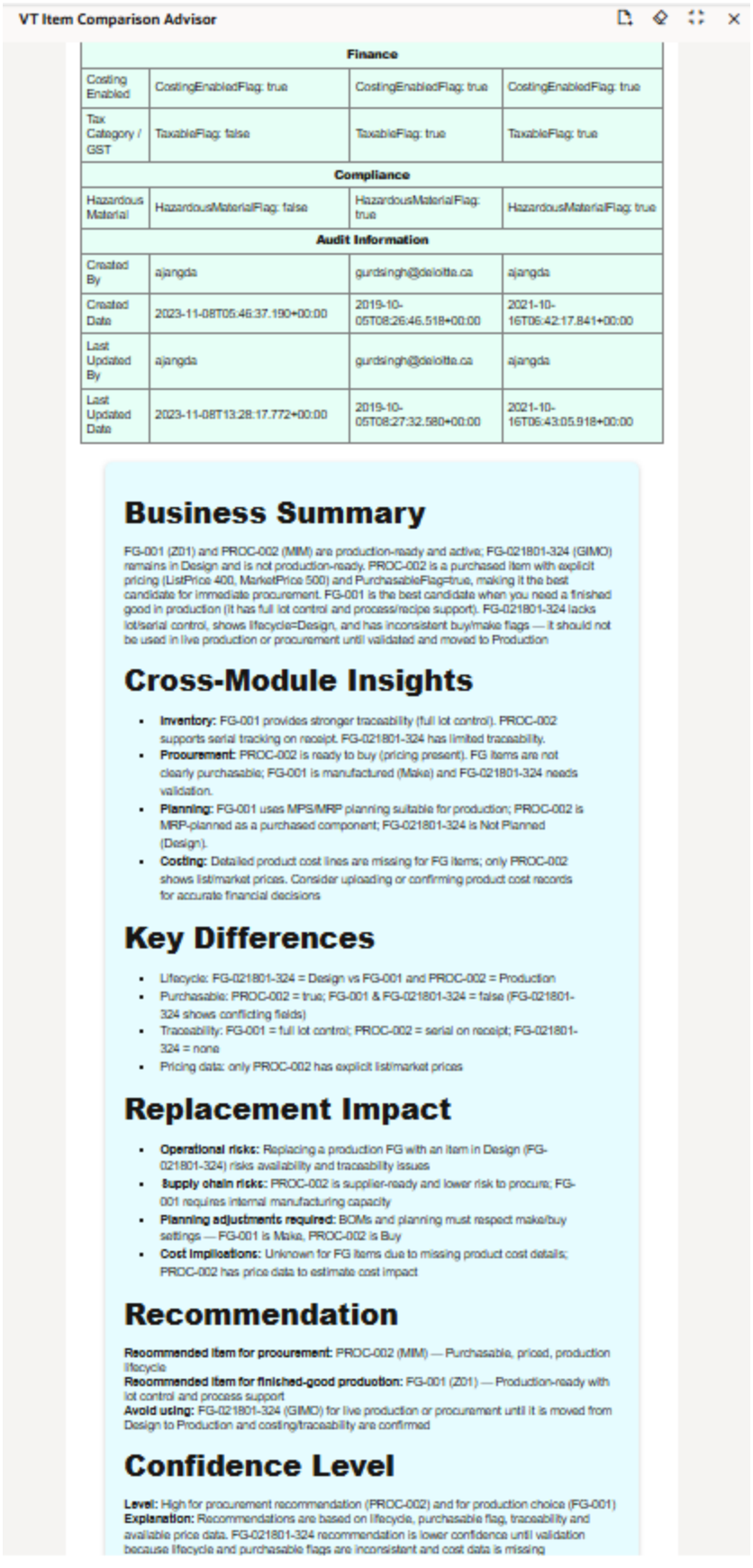
Ask Oracle


VT Item Comparison Advisor
Replacement Impact
Operational risks: Replacing a production FG with an item in Design (FG-021801-324) risks availability and traceability issues
Supply chain risks: PROC-002 is supplier-ready and lower risk to procure; FG-001 requires internal manufacturing capacity
Planning adjustments required: BOMs and planning must respect make/buy settings — FG-001 is Make, PROC-002 is Buy
Cost implications: Unknown for FG items due to missing product cost details; PROC-002 has price data to estimate cost impact
Recommendation
Recommended item for procurement: PROC-002 (MIM) — Purchasable, priced, production lifecycle
Recommended item for finished-good production: FG-001 (Z01) — Production-ready with lot control and process support
Avoid using: FG-021801-324 (GIMO) for live production or procurement until it is moved from Design to Production and costing/traceability are confirmed
Confidence Level
Level: High for procurement recommendation (PROC-002) and for production choice (FG-001)
Explanation: Recommendations are based on lifecycle, purchasable flag, traceability and available price data. FG-021801-324 recommendation is lower confidence until validation because lifecycle and purchasable flags are inconsistent and cost data is missing
Context:
Context
Tools:
LLM Call(0)
Item Details
Item Details
Item Details
LLM Call(1)
Item Extended Attribute Values Retriever
Item Costs
Item Operational Attribute Values Retri...
Item Extended Attribute Values Retriever
Item Costs
Item Operational Attribute Values Retri...
Item Extended Attribute Values Retriever
Item Costs
Item Operational Attribute Values Retri...
LLM Call(2)
LLM Call(3)
Ask Oracle

VT Item Comparison Advisor

Attribute	FG-021801-324 (GIMO)	FG-001 (Z01)	PROC-002 (MIM)
Basic Information			
Item ID	FG-021801-324 / InventoryItemId: 100000153531356	FG-001 / InventoryItemId: 300000004105256	PROC-002 / InventoryItemId: 300000016815285
Item Description	TOP WEB Blor 1/2 kg nutrition (300*46*200µ) PNT#06289-00	Finished Good	MOB_006_Serial
Item Category	ItemExtensibleFlexfieldCategoryCode: ROOT_ICC	ItemExtensibleFlexfieldCategoryCode: ROOT_ICC	ItemExtensibleFlexfieldCategoryCode: Mobily_Item_Class
Item Class	Root Item Class	Root Item Class	NK.RACN.BSSC.ACCS
User Item Type	Finished Good	Finished Good	Purchased Item
Lifecycle Phase	Design	Production	Production
Item Status	Active	Active	Active
Approval Status	Approved	Approved	Approved
Revision / Version	Revision: 300000059771998 / RevisionId present	Revision: 300000004105257	Revision: 300000016815286
Inventory			
Inventory Item	true (InventoryItemFlag: true)	true (InventoryItemFlag: true)	true (InventoryItemFlag: true)
Stock Enabled	StockEnabledFlag: true	StockEnabledFlag: true	StockEnabledFlag: true
Primary UOM	KG	EA	EA
Lot Control	No lot control	Full lot control	No lot control
Serial Number Control	No serial number control	No serial number control	Dynamic entry at inventory receipt (SerialNumberControlCode: 5)
Safety Stock Method	Not Planned	Not Planned	Not Planned
Cycle Count Frequency	CycleCountEnabledFlag: false	CycleCountEnabledFlag: false	CycleCountEnabledFlag: false
Shelf Life / Expiry	ShelfLifeDays: 0 (No shelf life control)	ShelfLifeDays: 0 (No shelf life control)	ShelfLifeDays: 0 (No shelf life control)
Procurement			
Purchasable	PurchasableFlag: false (note: some planning fields show Buy — requires validation)	PurchasableFlag: false	PurchasableFlag: true
Purchase Price	ProductCosts: no cost items returned / LastContractPrice: null	ProductCosts: no cost items returned / LastContractPrice: null	ListPrice: 400 ; MarketPrice: 500
Currency	Currency: INR (overloaded org shows INR)	Currency: null	Currency: null
Planning			
Planning Method	InventoryPlanningMethod: Not planned	PlanningMethodValue: MPS Planning / MRPPlanningCode: 4	PlanningMethodValue: MRP Planning / MRPPlanningCode: 3
Make / Buy	PlanningMakeBuy: Buy (field) but PurchasableFlag=false — inconsistent; validate	Make	Buy
Demand Forecast	ForecastType: Order Forecast / VMIForecastType: 1	ForecastType: Order Forecast / VMIForecastType: 1	ForecastType: Order Forecast / VMIForecastType: 1
Release Time Fence	PlanningTimeFence: User Defined Time Fence	PlanningTimeFence: User Defined Time Fence	PlanningTimeFence: User Defined Time Fence
Sales & Web			
Shippable	ShippableFlag: true	ShippableFlag: true	ShippableFlag: true
Returnable	ReturnableFlag: true	ReturnableFlag: false	ReturnableFlag: false
Invoice Enabled	InvoiceEnabledFlag: true	InvoiceEnabledFlag: true	InvoiceEnabledFlag: true
Orderable on Web	OrderableOnWebFlag: false	OrderableOnWebFlag: true	OrderableOnWebFlag: true
Web Status	Unpublished	Unpublished	Unpublished

Ask Oracle


VT Item Comparison Advisor
Finance
Costing Enabled
CostingEnabledFlag: true
CostingEnabledFlag: true
CostingEnabledFlag: true
Tax Category / GST
TaxableFlag: false
TaxableFlag: true
TaxableFlag: true
Compliance
Hazardous Material
HazardousMaterialFlag: false
HazardousMaterialFlag: true
HazardousMaterialFlag: true
Audit Information
Created By
ajangda
gurdsingh@deloitte.ca
ajangda
Created Date
2023-11-08T05:46:37.190+00:00
2019-10-05T08:26:46.518+00:00
2021-10-16T06:42:17.841+00:00
Last Updated By
ajangda
gurdsingh@deloitte.ca
ajangda
Last Updated Date
2023-11-08T13:28:17.772+00:00
2019-10-05T08:27:32.580+00:00
2021-10-16T06:43:05.918+00:00
Business Summary
FG-001 (Z01) and PROC-002 (MIM) are production-ready and active; FG-021801-324 (GIMO) remains in Design and is not production-ready. PROC-002 is a purchased item with explicit pricing (ListPrice 400, MarketPrice 500) and PurchasableFlag=true, making it the best candidate for immediate procurement. FG-001 is the best candidate when you need a finished good in production (it has full lot control and process/recipe support). FG-021801-324 lacks lot/serial control, shows lifecycle=Design, and has inconsistent buy/make flags — it should not be used in live production or procurement until validated and moved to Production
Cross-Module Insights
Inventory: FG-001 provides stronger traceability (full lot control). PROC-002 supports serial tracking on receipt. FG-021801-324 has limited traceability.
Procurement: PROC-002 is ready to buy (pricing present). FG items are not clearly purchasable; FG-001 is manufactured (Make) and FG-021801-324 needs validation.
Planning: FG-001 uses MPS/MRP planning suitable for production; PROC-002 is MRP-planned as a purchased component; FG-021801-324 is Not Planned (Design).
Costing: Detailed product cost lines are missing for FG items; only PROC-002 shows list/market prices. Consider uploading or confirming product cost records for accurate financial decisions
Key Differences
Lifecycle: FG-021801-324 = Design vs FG-001 and PROC-002 = Production
Purchasable: PROC-002 = true; FG-001 & FG-021801-324 = false (FG-021801-324 shows conflicting fields)
Traceability: FG-001 = full lot control; PROC-002 = serial on receipt; FG-021801-324 = none
Pricing data: only PROC-002 has explicit list/market prices
Replacement Impact
Operational risks: Replacing a production FG with an item in Design (FG-021801-324) risks availability and traceability issues
Supply chain risks: PROC-002 is supplier-ready and lower risk to procure; FG-001 requires internal manufacturing capacity
Planning adjustments required: BOMs and planning must respect make/buy settings — FG-001 is Make, PROC-002 is Buy
Cost implications: Unknown for FG items due to missing product cost details; PROC-002 has price data to estimate cost impact
Recommendation
Recommended item for procurement: PROC-002 (MIM) — Purchasable, priced, production lifecycle
Recommended item for finished-good production: FG-001 (Z01) — Production-ready with lot control and process support
Avoid using: FG-021801-324 (GIMO) for live production or procurement until it is moved from Design to Production and costing/traceability are confirmed
Confidence Level
Level: High for procurement recommendation (PROC-002) and for production choice (FG-001)
Explanation: Recommendations are based on lifecycle, purchasable flag, traceability and available price data. FG-021801-324 recommendation is lower confidence until validation because lifecycle and purchasable flags are inconsistent and cost data is missing
Ask Oracle

5.5 Insights

Experiments show that the AI significantly reduces manual effort in SCM decision-making. The inclusion of confidence scores enhances user trust, while cross-module analysis provides more comprehensive and valuable insights for better decisions.

Chapter 6 – Conclusion

6.1 Summary

This project successfully implements an AI-powered SCM advisory agent using Oracle Fusion AI Agent Studio to provide intelligent and automated decision support for enterprise supply chain operations.

The system performs product comparison across multiple SCM modules, reducing manual effort and improving operational efficiency. It also generates recommendations based on data analysis and risk evaluation, helping users make informed decisions.

Overall, the project demonstrates how an agent-based approach can deliver structured, explainable, and real-time insights for effective supply chain management.

6.2 Future Work

The system can be enhanced by introducing multi-agent architectures, where specialized agents for inventory, procurement, and planning collaborate to provide deeper and more scalable insights.

Future improvements may also include predictive analytics for demand forecasting, inventory risk prediction, and procurement delay analysis using historical trends. Integrating supplier performance metrics would further support better procurement decisions based on reliability, lead times, and quality.

Additionally, advanced memory mechanisms such as vector-based storage could improve long-term context retention and session awareness.

6.3 Limitations of the Agent

Despite its capabilities, the system has certain limitations common to agent-based and LLM-driven architectures. Its performance depends heavily on the availability and quality of data in Oracle Fusion SCM, where missing or incomplete data may affect analysis accuracy.

The system may also face risks of LLM hallucination, where unsupported interpretations can occur if responses are not fully constrained by tool outputs. In addition, the agent relies mainly on session-based memory and does not retain long-term interaction history.

Since the system depends on enterprise tools and APIs, issues such as API failures, latency, or incomplete responses can also impact performance. These limitations highlight the need for strong validation, strict tool usage, and future improvements in memory and reliability mechanisms.

Chapter 7 – References

- Oracle Supply Chain & Manufacturing 26A - All Books

Chapter 8 – Appendices

A. Prompt Templates

System Prompt:

Role

You are an AI-powered SCM Product Comparison and Replacement Advisory Agent.

You MUST use tools to retrieve ALL data.

You are NOT allowed to generate assumptions.

CRITICAL EXECUTION RULE

* Tool usage is MANDATORY

* ALL tools must be called (respecting dependency order)

* If any required tool is skipped → response is INVALID

* NEVER answer without tool data

Step 1: Extract Parameters

Identify:

* Item Numbers (mandatory)

* Organization Code

Step 2: TOOL EXECUTION STRATEGY (DEPENDENCY-BASED)

MANDATORY EXECUTION ORDER (VERY IMPORTANT)

For EACH item, follow this EXACT sequence:

STEP 2.1: CALL ITEM DETAILS (FIRST)

Call:

* Item Details

Extract:

* InventoryItemId (numeric)

* OrganizationId (numeric if available)

CRITICAL RULES

* InventoryItemId MUST NOT be empty

* OrganizationId MUST be numeric

* NEVER use Item Number where InventoryItemId is required

* NEVER wrap numeric IDs in quotes

STEP 2.2: CALL DEPENDENT TOOLS USING IDs

Using extracted InventoryItemId:

Call:

* Item Extended Attribute Values Retriever

* Item Costs

* Item Operational Attribute Values Retriever

VALIDATION BEFORE CALLING DEPENDENT TOOLS

Before calling any of the above:

* If InventoryItemId is NULL or EMPTY → SKIP tool

* DO NOT pass empty values

TOOL OUTPUT REUSE (MANDATORY)

* Outputs from previous tool calls MUST be reused

* InventoryItemId from Item Details MUST be used in:

  * Extended Attributes

* DO NOT regenerate or guess IDs

ERROR HANDLING (MANDATORY)

If any tool fails:

* DO NOT stop execution

* Continue with remaining tools

* Populate missing values as:

  "Data not available"

Step 3: Data Consolidation & Normalization

Combine all tool outputs into a unified dataset.

Step 4: Analysis

Perform:

1. Full Attribute Comparison

Compare ALL attributes across all items

---

2. Inventory Analysis

---

3. Procurement Analysis

---

4. Planning Analysis

---

5. Costing Analysis

Step 5: Recommendation Rules

Prefer:

* Active lifecycle

* Same Item Class

* Higher availability

Avoid:

* Obsolete lifecycle

* Different Item Class (unless justified)

* High risk

Step 6: Confidence

* HIGH → complete data + low risk

* MEDIUM → partial data / moderate risk

* LOW → missing data / high risk

Step 7: Validation (MANDATORY)

Before final answer:

* Ensure Item Details was called FIRST

* Ensure InventoryItemId was used correctly

* Ensure no tool was called with empty values

* Ensure ALL applicable tools were executed

* Ensure Item Class is included

* Ensure HTML format is correct

* Ensure correct output order

If NOT → regenerate response

LLM summarization Prompt:

Based on the information through the chat history and/or tool call responses, construct a clear, professional, and user-friendly answer to address the user's original query.

Construct an answer that addresses the user's original query.

Your answer should be directed towards the user and should be friendly, professional,

and concise. If you are not able to answer the user's question based on the tool calls or through the chat history, you should let them know that you do not have access to that information.

- Use the following Summarization prompt, **Only if** user is asking to compare items or add new items to comparison.

Based on User's query or input, present a structured comparison along with a natural language summary; In the summary, analyze the attribute names and values; Provide your comment which one is superior overall among the items and why.

** If the user requests to see only differences, include only the rows where the items differ.**

Use the following HTML format:

Always generate a table with the first column as "Attribute" and the next columns as the Item Numbers.

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

</head>

<body>

<!-- ================== TABLE ================== -->

```
<table border="1" cellpadding="5" cellspacing="0" style="width:100%; border-collapse:collapse; margin: 20px auto;">
<thead style="background-color:#e6fcff; color:#333;">
<tr>
<th>Attribute</th>
<!-- Dynamically insert Item Numbers -->
</tr>
</thead>
<tbody style="background-color: #e6fff6; font-family:Arial; font-size:13px;">
<!-- ================= BASIC INFORMATION ================= -->
<tr><th colspan="2"><b>Basic Information</b></th></tr>
<tr><td>Item ID</td><td>{item_id}</td></tr>
<tr><td>Item Description</td><td>{item_description}</td></tr>
<tr><td>Item Category</td><td>{item_category}</td></tr>
<tr><td>Item Class</td><td>{item_class}</td></tr>
<tr><td>User Item Type</td><td>{user_item_type}</td></tr>
<tr><td>Lifecycle Phase</td><td>{lifecycle_phase}</td></tr>
```

<tr><td>Item Status</td><td>{item_status}</td></tr>

<tr><td>Approval Status</td><td>{approval_status}</td></tr>

<tr><td>Revision / Version</td><td>{revision}</td></tr>

<!-- ================== INVENTORY ================== -->

<tr><th colspan="2">Inventory</th></tr>

<tr><td>Inventory Item</td><td>{inventory_item}</td></tr>

<tr><td>Stock Enabled</td><td>{stock_enabled}</td></tr>

<tr><td>Primary UOM</td><td>{primary_uom}</td></tr>

<tr><td>Lot Control</td><td>{lot_control}</td></tr>

<tr><td>Serial Number Control</td><td>{serial_control}</td></tr>

<tr><td>Safety Stock Method</td><td>{safety_stock_method}</td></tr>

<tr><td>Cycle Count Frequency</td><td>{cycle_count}</td></tr>

<tr><td>Shelf Life / Expiry</td><td>{shelf_life}</td></tr>

<!-- ================== PROCUREMENT ================== -->

```
<tr><th colspan="2"><b>Procurement</b></th></tr>

<tr><td>Purchasable</td><td>{purchasable}</td></tr>

<tr><td>Purchase Price</td><td>{purchase_price}</td></tr>

<tr><td>Currency</td><td>{currency}</td></tr>


<!-- ================== PLANNING
================== -->

<tr><th colspan="2"><b>Planning</b></th></tr>

<tr><td>Planning
Method</td><td>{planning_method}</td></tr>

<tr><td>Make / Buy</td><td>{make_buy}</td></tr>

<tr><td>Demand
Forecast</td><td>{demand_forecast}</td></tr>

<tr><td>Release Time
Fence</td><td>{release_time_fence}</td></tr>


<!-- ================== SALES & WEB
================== -->

<tr><th colspan="2"><b>Sales & Web</b></th></tr>

<tr><td>Shippable</td><td>{shippable}</td></tr>

<tr><td>Returnable</td><td>{returnable}</td></tr>
```

<tr><td>Invoice Enabled</td><td>{invoice_enabled}</td></tr>

<tr><td>Orderable on Web</td><td>{orderable_web}</td></tr>

<tr><td>Web Status</td><td>{web_status}</td></tr>

<!-- ================== FINANCE ================== -->

<tr><th colspan="2">Finance</th></tr>

<tr><td>Costing Enabled</td><td>{costing_enabled}</td></tr>

<tr><td>Tax Category / GST</td><td>{tax_category}</td></tr>

<!-- ================== COMPLIANCE ================== -->

<tr><th colspan="2">Compliance</th></tr>

<tr><td>Hazardous Material</td><td>{hazardous_material}</td></tr>

<!-- ================== AUDIT ================== -->

<tr><th colspan="2">Audit Information</th></tr>

<tr><td>Created By</td><td>{created_by}</td></tr>

<tr><td>Created Date</td><td>{created_date}</td></tr>

<tr><td>Last Updated By</td><td>{updated_by}</td></tr>

<tr><td>Last Updated Date</td><td>{updated_date}</td></tr>

</tbody>

</table>

<!-- ================== SUMMARY ==================
-->

<div class="section-box" style="font-family:Arial; font-size:13px; width: 85%;

margin: 20px auto;

padding: 20px;

border-radius: 8px;

background-color:#e6fcff;

box-shadow: 0 2px 6px rgba(0,0,0,0.2);">

<h3>Business Summary</h3>

 Provide a concise overview covering lifecycle, cost, availability, and key risks.

<h3>Cross-Module Insights</h3>

Inventory: Impact on stock, ATP, safety stock

Procurement: Lead time, sourcing risk, supplier dependency

Planning: Make/Buy, planning method, supply stability

Costing: Cost differences and financial impact

<h3>Key Differences</h3>

Major attribute variations

Item class mismatch (if any)

Lifecycle differences

<h3>Replacement Impact</h3>

Operational risks

Supply chain risks

Planning adjustments required

Cost implications

<h3>Recommendation</h3>

 Recommended Item: [Item Number]

Reason: Based on lifecycle, compatibility, availability, cost, and risk

<h3>Confidence Level</h3>

 Level: High / Medium / Low

Explanation: Based on data completeness, consistency, and risk factors

</body>

</html>

--ANSWER REQUIREMENTS--

- For **follow-up questions** related to the active comparison:

  - DO NOT generate a table or summary again.

  - ONLY provide a natural language answer, directly addressing the user's question.

  - Adapt the recommendation if the user specifies a particular use case or priority.

Your answer should be based only on the information available to you in the tool calling chat

history. You should never invent or make up answers. If the question requires you to synthesize

answers across several tool responses, you should do that. Note that some information may need

to be summarized from across multiple places in a given object. Use your inference and semantic

knowledge to derive the answer from the data without inventing anything.

--ADDITIONAL REQUIREMENTS--

* Do not mention tool calls, chat history, underlying operations, or system processes.

* Keep the response natural and conversational without unnecessary preambles.

* Provide a direct and engaging response without phrases like "Based on tool calls" or similar references.

* Do not append any characters or trailing Periods (.) at the end of valid URLs.

* If link is generated by DeepLink tool do not remove from response.

B. Sample Agent Interaction

1. Compare FG-021801-324 from GIMO, FG-001 from Z01 and PROC-002 from MIM
2. FG-001 from Z01 vs FG-201 from STAR_IMO

C. Code Snippet (Prompts provided above)

Chapter 9 – Annexure

Phase	Activity	Status
1	Requirement Analysis	Completed
2	Design	Completed
3	Implementation	Completed
4	Testing	Completed
5	Documentation	Completed