Bath & Body Works® KEARNEY TEPPER Carnegie Mellon University Heinz College

2024 CMU Student Lab
Bath & Body Works
AI Utilization Strategy for Sourcing Operations
Final Presentation

Presented Date: December 6th 2024

Introducing the Faces Behind CMU Team

Business & Strategy

PoonPoonn Poonapanont (Team Coordinator)

MBA ‘25
Tech Strategy & Product Management

Chira Srisittiruk

MBA ‘25
AI in Business, Digital Transformation

Data Analytics & Technology

Lawrence Hua (Heinz Coordinator)

MISM ‘24
AI/ML, IT Strategy & Management

Isha Shingote

MISM ‘24
SWE, Cloud

Hema Jayanne Gowda

MISM ‘24
IT Strategy & Management

Snehal Khandve

MISM ‘24
SWE

Anesha Santhanam

MISM ‘24
IT Strategy & Management, IT Project Management

Highlights From Our Unforgettable Site Visit That Shaped Our Approach To This Project

Watching the bottle fillers in action was amazing!
🏭⚡✨ #FactoryEfficiency #BBWProductionMagic

Executive Summary

SITUATION & PROBLEM STATEMENT

Bath & Body Works is investigating how artificial intelligence (AI) might transform its sourcing practices.

The current sourcing process faces **challenges in decision making, supplier management, cost efficiency, and risk mitigation**.

OBJECTIVES

The project aims to **investigate how AI tools and processes might be applied to optimize these activities**. Provide actionable insights on how to strategically incorporate AI into Bath & Body Works sourcing processes to gain a competitive edge and achieve operational excellence.

KEY DELIVERABLES

In scope

- 4 use cases & prioritization
- High level sourcing processes
- Comparative analysis of AI solutions
- Technology readiness assessment
- Implementation framework & roadmap

Additional suggested scope we covered

- Feature Design
- Proof-of-Concept
- Cost-Benefit Analysis

Agenda

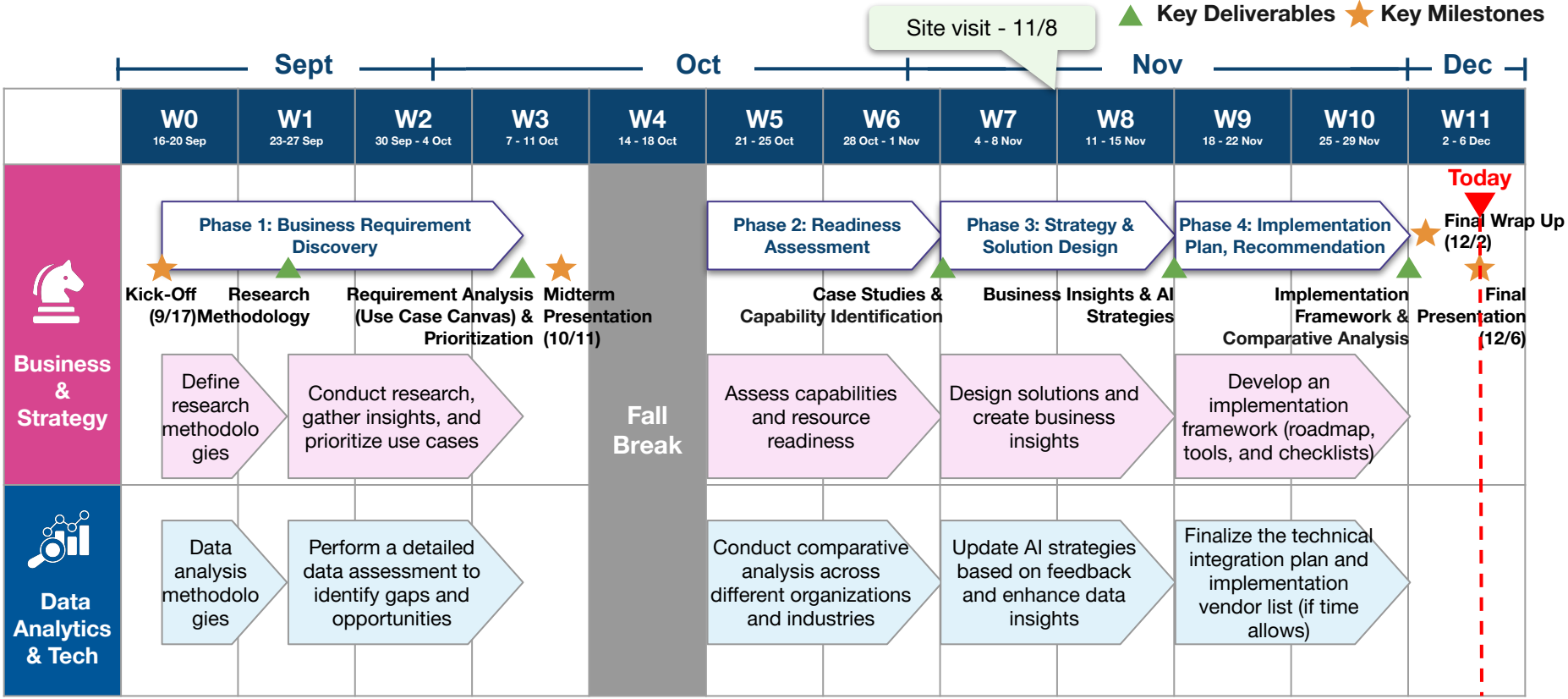
1. Project Approach & Use Cases
2. Comparative Analysis & Solution Design
3. Proof of Concept Demonstration
4. Implementation Plan & Potential Benefits
5. Final Recommendations and Next Steps
6. Q&A

Agenda

1. **Project Approach & Use Cases**

2. Comparative Analysis & Solution Design
3. Proof of Concept Demonstration
4. Implementation Plan & Potential Benefits
5. Final Recommendations and Next Steps
6. Q&A

High-level Overview of Our Project Plan, Which We Carried Out Over the Past 11 Weeks



We Identified 4 Use Cases across BBW's 8-Steps Sourcing Process Reflecting the Pain Points Shared by the Team

Current Process | Process with Suggested AI Use Cases

~3 - 4 weeks	~3 - 4 weeks	1 month	1 month	~2 - 3 weeks	continuously	~2 - 3 weeks	continuously
1. Identify Needs	2. Supplier Search	3. Evaluation of Suppliers	4. Negotiation (Price/Supply Agreement)	5. Establish Pricing for Order	6. Supplier Management and Relationship Building	7. Performance Evaluation "Scorecard"	8. On-going Risk Management/ Capacity Expansion

1 Risk assessment for reformulating products

Team **manually identifies true needs of sourcing raw materials when reformulating products** and conducts risk assessment for itemized ingredients (i.e. geopolitical, supplies disruption, alternate supply options).

SAP Ariba | GEP SMART | Amazon Personalize

2 Sourcing Event Creation & Maintenance (RFX)

The team **manually evaluates sourcing needs for top raw materials**, inputting data (price, MOQ, lead time) across documents (Excel and Word). Supplier evaluation lacks a standardized scorecard.

Power BI x Azure Bot Service | Power BI x Azure Machine Learning | SAP Ariba | IBM Watson

3 Unit cost validation

Currently, the team is using historical pricing to determine the unit cost of producing a single product. The pricing varies based on factors such as **purchase volume and timing, making it difficult to standardize and ensure the true cost**.

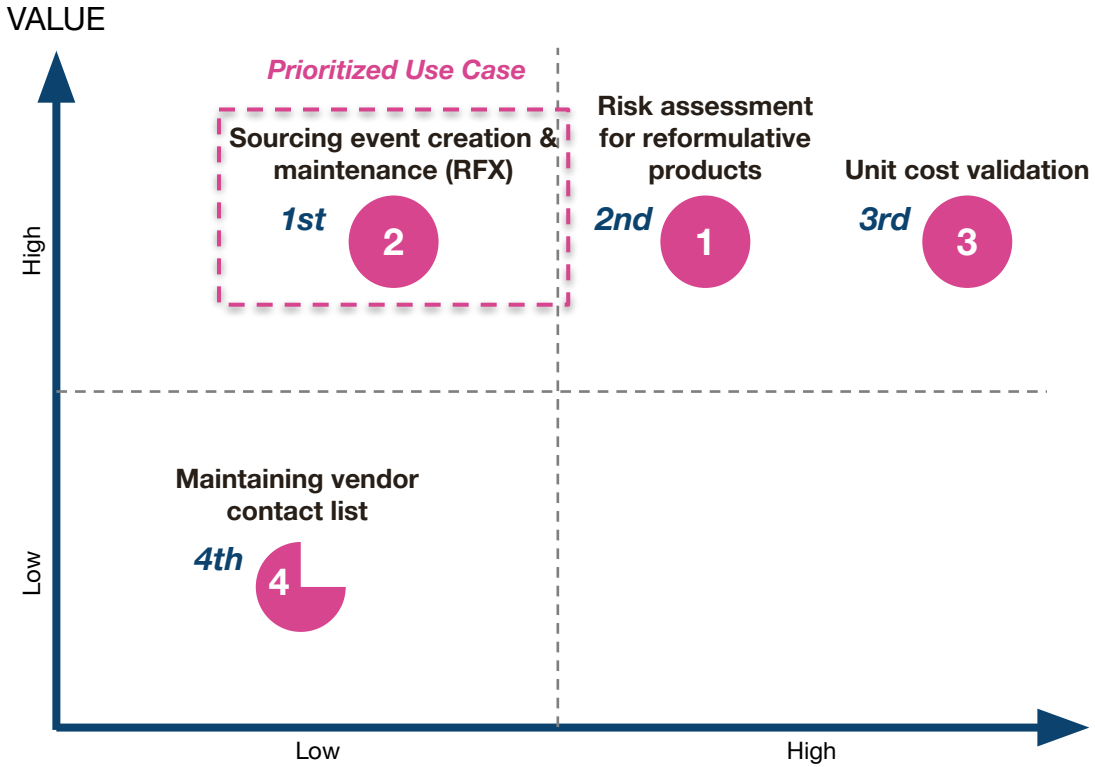
SAP Ariba | IBM Watson | coupa

4 Maintaining vendor contact list

The team **struggles to maintain accurate and up-to-date vendor contact lists** due to frequent changes in supplier personnel and high turnover in the industry. This leads to delays and inefficiencies when sourcing materials like bottles and caps.

Zoho Zia | Clearbit | UpLead

The RFX Use Case was Prioritized due to High Value to the Organization and Relatively Low Complexity



Prioritized Use Cases	
1st	Sourcing event creation & maintenance (RFX)
2nd	Risk assessment for reformulating products
3rd	Unit cost validation
4th	Maintaining vendor contact list

Data Available

Data Partially Available

Use cases are selected based on clients' **key pain points**. Value is measured by the **impact of AI solutions**, while complexity reflects the **difficulty of implementation**.

Agenda

1 Project Approach & Use Cases

2 **Comparative Analysis & Solution Design**

3 Proof of Concept Demonstration

4 Implementation Plan & Potential Benefits

5 Final Recommendations and Next Steps

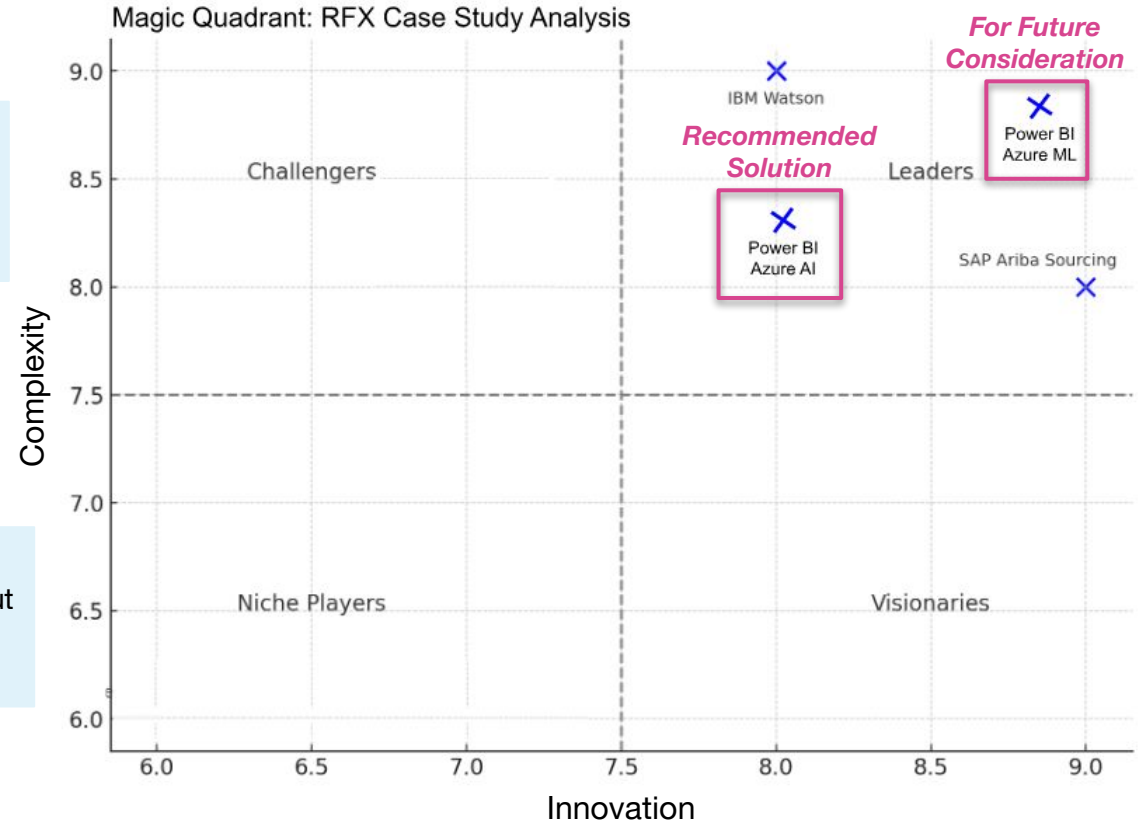
6 Q&A

Comparative Analysis of 3 Selected Use Cases

AI Vendors	Sourcing Event Creation & Maintenance (RFX)	Risk assessment for reformulating products	Unit cost validation
Power BI, AZURE BOT SERVICE	Seamless integration with BBW's Microsoft ecosystem; supports interactive sourcing workflows.		
Power BI, Azure Machine Learning	Strong predictive analytics capabilities for supplier performance and market trends.		
SAP Ariba	Proven supplier relationship and policy compliance features; automates complex sourcing workflows.	Comprehensive risk evaluation with compliance monitoring for procurement.	Global benchmarking and supplier pricing validation to align with market standards.
IBM Watson	Advanced AI insights for supplier selection; flexible integration with existing supply chain systems.		Market-aware cost validation to maintain competitive pricing.
GEP SMART	***Prioritized Use Case***	Delivers adaptive strategies for risk mitigation based on data trends.	
Amazon Personalize		Quick, accurate risk assessments; boosts prediction accuracy by 35%.	
coupa			Advanced spend management capabilities; integrates supplier pricing with global trends for accurate cost optimization.

Our Case Studies Showing Power BI with Azure AI as Recommended Solution

Challengers: excel in most standards but do not meet all (good for most, not all)

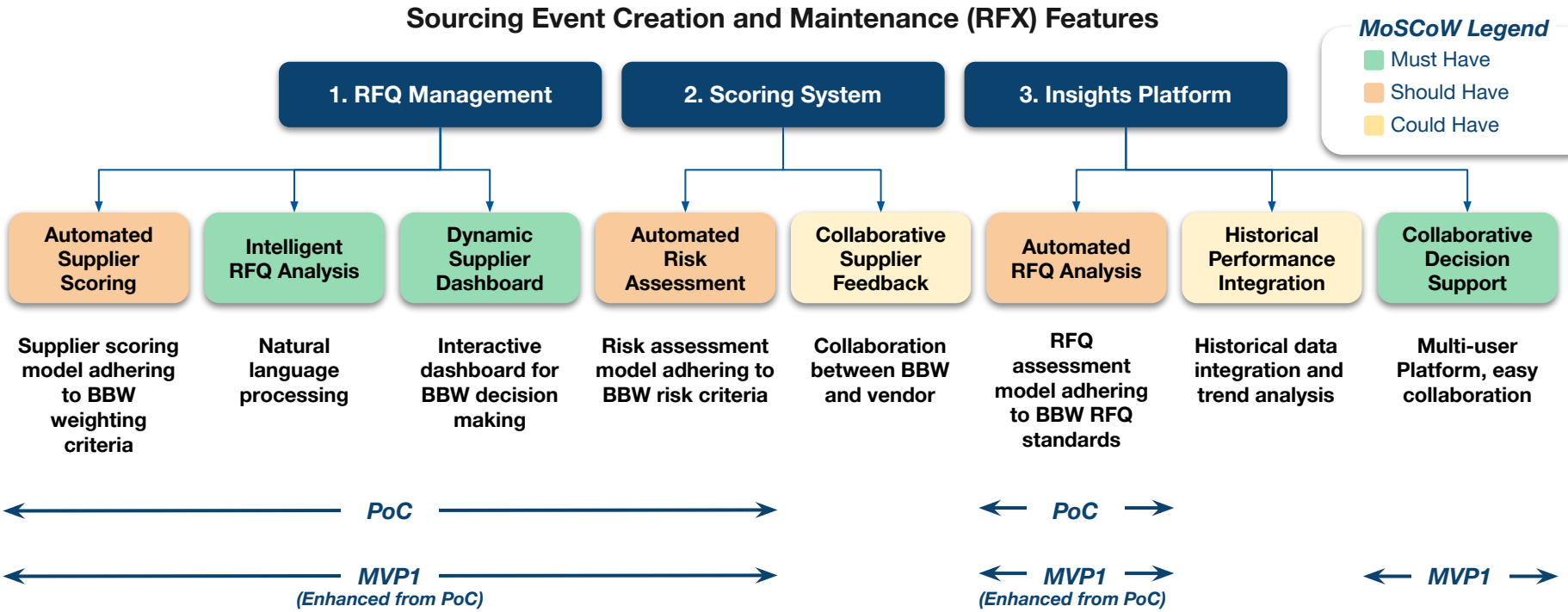


Leaders: excel in technical and innovative industry standards

Niche Players: innovative for some, but not for most: meets specific needs

Visionaries: innovative, good for looking ahead

3 Key Features, Each With Sub-features Prioritized to Highlight the Must-have and Should-have Elements Selected for PoC and MVP1



Agenda

1 Project Approach & Use Cases

2 Comparative Analysis & Solution Design

3 **Proof of Concept Demonstration**

4 Implementation Plan & Potential Benefits

5 Final Recommendations and Next Steps

6 Q&A

The 5 Key Differences Between Proof-of-Concept and Future Enhancements (MVP1)

		PoC		Future Enhancements (MVP1)
		 Synthetic data	1 →	 Cleaned BBW data
1. RFQ Management	Automated Supplier Scoring	python Ranking System	2 →	AZURE BOT SERVICE Intelligent Ranking Optimizer
	Intelligent RFQ Analysis	OpenAI NLP Chatbot with GPT	3 →	AZURE BOT SERVICE SmartChatbot with Azure AI
	Dynamic Supplier Dashboard	Flask BBW Rec tool Flask UI	4 →	Power BI Custom AI driven Power BI dashboard UI
2. Scoring System	Automated Risk Assessment	python Recommendation System	5 →	AZURE BOT SERVICE AI-Powered Intelligent Recommendations
3. Insights Platform	Automated RFQ Analysis			

Recommendation System & Conversational AI Chatbot (Overview)

Key Objective: To **enable efficient supplier evaluation** by providing **a filtering and ranking mechanism** based on critical metrics (Price, Lead Time, MOQ) and to support decision-making through **an interactive chatbot** that delivers insights and visualizations.

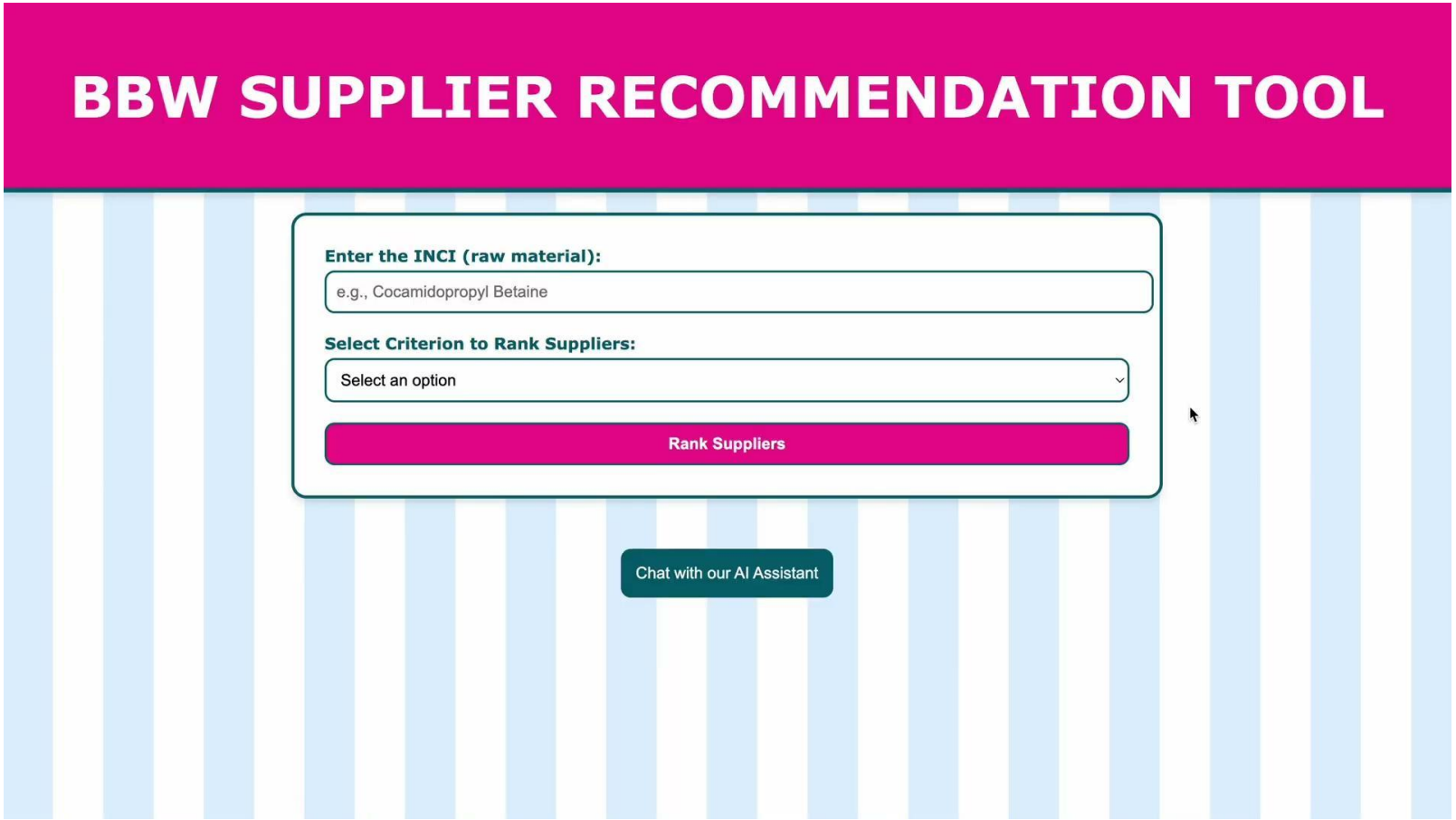
1. Recommendation System

1. **Filter Suppliers**: Users can filter suppliers based on individual metrics—Price, Lead Time, or MOQ.
2. **Rank Suppliers**: Users can view a comprehensive ranking based on a weighted scoring system:
    - **Price (70%)**: Highest priority for cost-effectiveness.
    - **Lead Time (20%)**: Ensures timely delivery.
    - **MOQ (10%)**: Lower importance compared to the other factors.

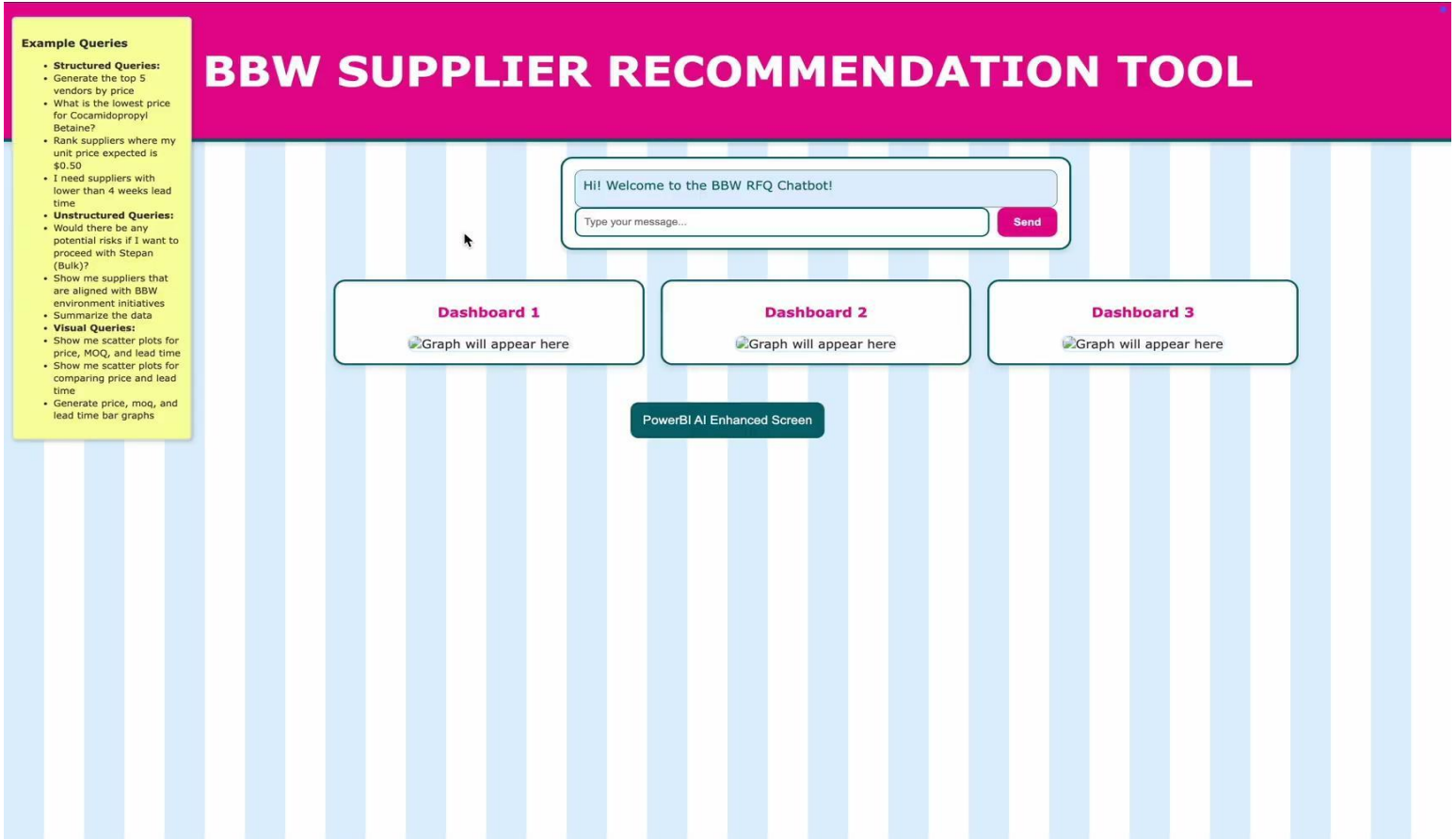
2. Conversational AI Chatbot

1. We've developed a **chatbot** that enables users to ask natural language questions and receive insights and visualizations.
2. Example of user queries:
    a. "Which supplier has the lowest lead time?" - The chatbot identifies the supplier with the shortest lead time.

1. Recommendation System: Scorecard (Demo - Video)



2. Conversational AI Chatbot: Chatbot (Demo - Video)



There Are 3 Potential Risks and Mitigation Plans We Foresee When Shifting from PoC to MVP1

		Risk	***Mitigation***
1	**Data Quality and AI Accuracy**	Real-world data inconsistencies may impact model accuracy and performance.	Perform data cleaning and validation, retrain AI models with BBW data, and leverage continuous learning to ensure reliability.
2	**System Complexity and Integration**	Advanced features and multiple tool integrations could lead to performance bottlenecks and compatibility issues.	Use modular development, standardized APIs, and scalable cloud solutions to streamline integration and ensure optimal system performance.
3	**Adoption, Compliance, and Scalability**	Resistance to new tools, regulatory concerns, and scalability challenges may hinder implementation.	Conduct user training, adhere to data security laws, implement elastic cloud solutions, and optimize algorithms for real-time performance.

Agenda

1 Project Approach & Use Cases

2 Comparative Analysis & Solution Design

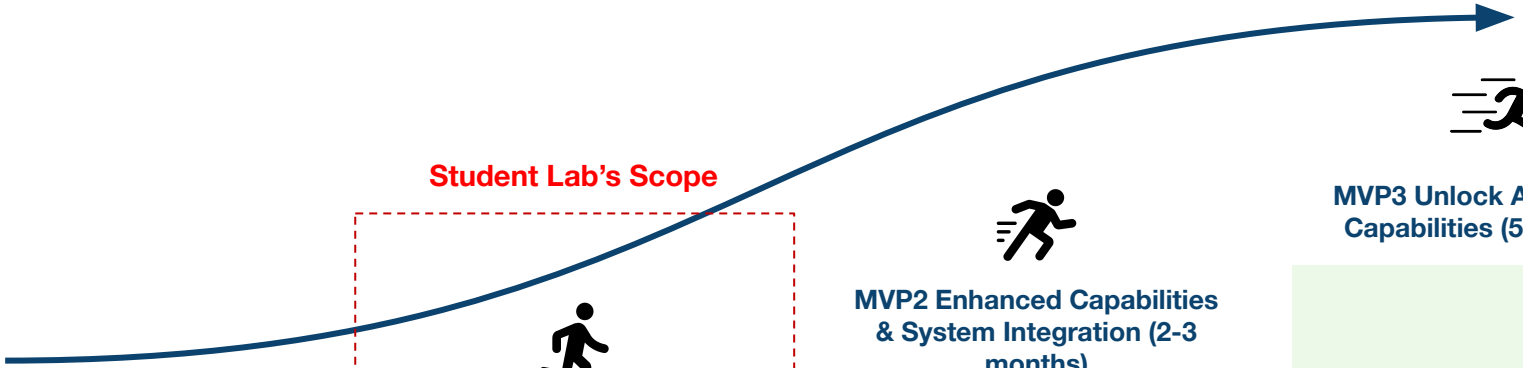
3 Proof of Concept Demonstration

4 Implementation Plan & Potential Benefits

5 Final Recommendations and Next Steps

6 Q&A

Implementation Plan for RFX



Student Lab's Scope

Student's provided design documents and POC for features of MVP1

MVP1 RFX Dashboard & Chatbot (2-3 months)

- Basic RFQ tracking and workflow.
- High-level Power BI dashboards.
- Azure AI Bot Services for conversational query.
- Basic ranking of RFQs.

MVP2 Enhanced Capabilities & System Integration (2-3 months)

- Integrated corporate database and channels (e.g., ms team/slack).
- Dynamically scoring (e.g., customizable metrics, simulations).
- Real-Time Chatbot Insights (e.g., flagging potential risks in scoring).

MVP3 Unlock AI Predictive Capabilities (5-7 months)

- Predictive RFQ management powered by AI.
- Real-time RFQ insights and alerts.
- AI-driven scoring based on real-time and historical data.
- Predictive scoring for supplier outcomes.

Enabling Technologies

Power BI · AZURE BOT SERVICE

Power BI · AZURE BOT SERVICE · BBW database

Power BI · Azure Machine Learning · BBW database

Implementation Framework

	1. Discovery	2. Proof of Concept (PoC)*	3. Design	4. Development	5. Testing and Validation	6. Deployment	7. Monitoring and Optimization
	What do we need and where are the gaps?	*Will this work?*	*How will we implement this?*	*Are we building it correctly?*	*Does it meet expectations?*	*How do we launch effectively?*	*How do we improve and scale?*
Key Actions	Identify business needs, assess technology readiness, and conduct AI landscape.	Build and test prototypes to validate feasibility and measure impact.	Define technical requirements and implementation plan.	Build, configure, and integrate tools while resolving technical issues.	Conduct user testing, evaluate performance, and resolve issues.	Roll out solutions, train users, and establish support systems.	Gather feedback, and refine workflows for scalability.
Desired Outcomes	Clear requirements, stakeholder alignment, and prioritise use cases.	Proven value and identified challenges.	Approved workflows, designs, or mock-ups aligned with user needs.	Fully functional and integrated systems ready for testing.	Validated solutions and stakeholder approval for deployment.	Fully deployed solutions and confident, trained users.	Optimized systems, high user satisfaction, and scalability.
Use Cases Covered In This Project	✔ RFX ✔ Risk Assessment ✔ Unit Cost Validation ✔ Vendor Contact Lists	✔ RFX	✔ RFX (possible revisit if required)				

*A PoC is only required when there is a level of uncertainty about feasibility, integration, or value.

RFX MVP1 Potential Benefits Based on Cost-Benefit Analysis

26.11%

Capacity freed up per 1 FTE for 1 RFx

18.8 hrs

Hours saved per 1 RFx

Agenda

1 Project Approach & Use Cases

2 Comparative Analysis & Solution Design

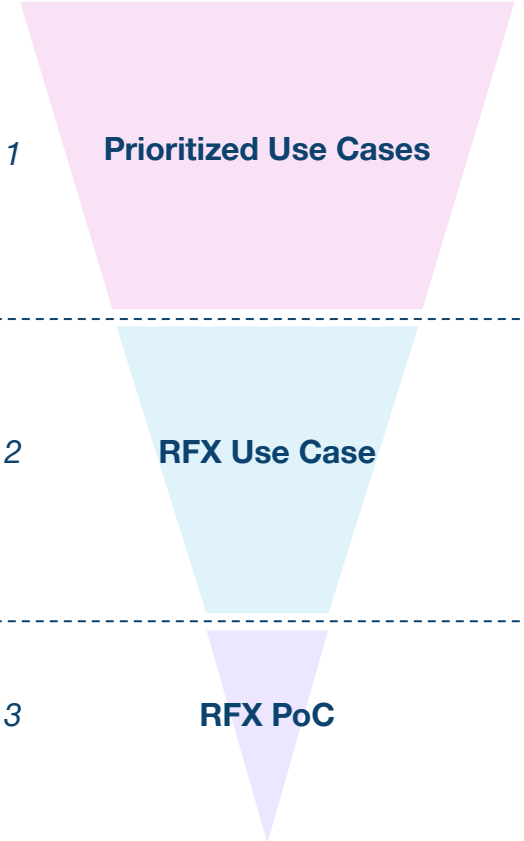
3 Proof of Concept Demonstration

4 Implementation Plan & Potential Benefits

5 **Final Recommendations and Next Steps**

6 Q&A

Final Recommendation: Three-Tier Strategy to Transform Sourcing with AI-Powered Solutions



Tier 1 **Prioritized Use Cases**

(in the order of priority 1-4)

1. **Sourcing Event Creation & Maintenance (RFX)** — Streamline supplier comparisons and reduce manual workload.
2. **Risk assessment for reformulating products** — Address bandwidth constraints for in-depth risk assessments.
3. **Unit cost validation** — Enhance raw material cost comparisons among suppliers.
4. **Maintaining vendor contact list** — Ensure reliable and up-to-date supplier contact information.

Tier 2 **RFX Use Case**

MVP1 RFX Dashboard & Chatbot (2-3 months) — Power BI, Azure Bot Service

MVP2 Enhanced Capabilities & System Integration (2-3 months) — Power BI, Azure Bot Service, BBW database

MVP3 Unlock AI Predictive Capabilities (5-7 months) — Power BI, Azure Machine Learning, BBW database

Tier 3 **RFX PoC**

With the prototype successfully developed and validated, **the solution is ready to scale to enterprise-level tools** like Power BI and Azure AI, unlocking its full potential to drive greater efficiency and impact in sourcing processes.

We Recommend 3 Next Steps for Bath and Body Works to Explore to Prepare for an Enterprise-Scale Solution and Maximize Value

1. Data Validation

Collect **structured data** to reduce the time spent on data cleaning and preparation. Establishing clear data collection protocols can further streamline the process.

2. Qualitative Insights

Incorporate **qualitative insights**, such as incumbent status and previous award winners, to enhance predictive models and provide a deeper understanding of trends.

3. Scaling the Solution

Develop a **custom AI-driven dashboard** with Power BI and Azure AI to optimize operations and scale for **broader use cases** to deliver greater value.

"We believe harnessing artificial intelligence in sourcing will pave the way for an intelligence-driven future at Bath & Body Works, unlocking unprecedented efficiency and innovation."

- CMU BBW Student Lab Team