Project Management Framework for AI Products

Hybrid Methodology (Traditional + Agile)

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This document, Project Management Framework for AI Products, is based on the master's thesis titled "AI-based Nutrition Augmented Reality App for Supermarket Chains", developed as part of the Global Master's in Project Management program at EAE Business School.

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The framework is based on and described using the principles and best practices of the Project Management Institute (PMI), integrating traditional and agile methodologies applied to AI-driven product development.

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1. Project Context

This chapter sets out the foundation by analyzing the environment in which the project will be executed. It includes a detailed overview of the executing organization and the client, covering strategic goals, organizational structure, and contextual analysis tools such as SWOT, and PREN of the executing organization. Ensuring a clear understanding of the project's background and stakeholders.

1.1 Analysis of the project executing organization

The present project has the objective of introducing to the food industry an application that will support conscious nutrition and sustainability, increase organic product consumption, support local producers to widespread their products, and reduce the contamination and waste of food products in the USA. The solution proposed is intended for filling out the information gap regarding the healthy and environmentally friendly choices of users with the additional benefit of empowering users to feed local economies.

This project is the result of a joint initiative between Innovative Consulting Group (ICG), an innovative and forward-thinking consulting group based in Austin, Texas, with extensive experience in AI-powered platforms, data analytics, and digital transformation. With a strong focus on healthcare technology and consumer behavior, ICG operates at the intersection of technology and social impact. The company operates exclusively from its Austin office and has approximately 45 employees, including software engineers, data scientists, UX/UI designers, and contractors. It fosters close collaboration among its multidisciplinary teams and maintains a centralized management structure.

ICG generates approximately $6.2 million in annual revenue and executes between 8 to 10 strategic projects per year, with a number of consultants acting as the main point of contact with clients, ICG works with both public and private sectors, including startups, NGOs, and multinational corporations. The firm is also an active member of the startup scenery, often serving as mentor and technology partner in innovation competitions and incubators.

The consulting company is structured into three core divisions:

Digital Solutions and AI labs: with focus on developing scalable platforms using machine learning, predictive analytics and real time data processing

Sustainability and Innovation Strategy: advises clients on integrating ESG goals into business models, with a focus on circular economy and green tech.

Behavioral Insights and Customer Experience: Using data science and behavioral economics to design user-centric solutions that drive engagement and impact.

ICG's vision is to be a leader in technology consulting with social impact, promoting solutions that transform communities. The mission is to design and implement digital platforms that integrate artificial intelligence, sustainability, and human behavior to solve complex challenges. This is

based on the organization's values: Collaboration, social impact, sustainability, excellence, innovation, and ethics.

For ICG, the strategic objectives are based on developing innovative AI-based solutions that deliver added value to communities, as well as being mindful of sustainability and healthy eating. Establish as leading brands in digital health and sustainability to promote projects with environmental and social impact.

Strategic matrices

SWOT ANALYSIS

Strengths	Weaknesses
Experience in AI and digital health.	Limited company size.
Focus on social impact.	Dependence on a few key customers.
Multidisciplinary team.	Limited ability to scale quickly.
Opportunities	**Threats**
Trend toward conscious consumption.	Competition from large consulting firms.
Partnerships with supermarkets and NGOs.	Unexpected regulatory changes.

PREN

Factor	Potential Risk
Political	Changes in public health policies
Regulatory	New rules on health and nutrition apps
Economic	Recession that limits investment in innovation
Legislative	Strict food safety and certification requirements

1.2 Analysis of the client or beneficiary of the project

FoodMart (Sponsor) is a multinational American supermarket chain headquartered in Austin, Texas. It has more than 1,200 stores nationwide and a workforce of approximately 38,000 employees. Its strategy focuses on promoting the health and sustainability of its customers. It seeks to attract new segments of customers focused on conscious nutrition and changing the consumption patterns of existing customers. Known for its commitment to customer wellness, sustainability and community engagement, FoodMart positioned itself as a leader in responsible retail.

FoodMart's mission is to offer products and services that promote the comprehensive well-being of its customers, while its vision is to lead the transformation of food consumption toward more conscious, healthy, and responsible practices. Its values include transparency, innovation, respect for the environment, and social inclusion.

The company’s structure includes three main divisions that are directly collaborating with ICG on the application development:

Retail Operation division that manages store format ranging from express outlets to hypermarkets, with a focus on accessibility and convenience.

Health and Sustainability Office driving initiatives related to nutrition, food labeling, waste reduction and sustainability sourcing.

Customer Insights and Innovation hub focuses on understanding evolving consumer needs and piloting new technologies to enhance the shopping experience.

Within these divisions the strategic goal of FoodMart will include attracting health-conscious consumers, shift consumption patterns and collaborate with other companies and consultancies to bring innovative solutions to the food industry.

Through a strategic collaboration with ICG, FoodMart seeks to consolidate its leadership in responsible retail by aligning its operations with trends in health, sustainability, and consumer technology. This initiative addresses the need to attract new market segments of nutrition-minded consumers, transform current consumption patterns, encourage the purchase of organic and sustainable products, reduce waste through digital tools that promote informed decisions, and strengthen the local economy for products from small, regional producers. This requires the development of a project with an estimated cost of $869,600 and working with a core team of 12 people (including internal resources and contractors) the project will count on the collaboration of two engaged organizations with the goal of addressing health and nutrition issues.

2. Business Case and Project Framework

The rationale behind the project is presented through a comprehensive business case. It includes justification, strategic alignment, feasibility analysis, and expected benefits. The section also outlines the chosen project management framework explaining its suitability and implementation strategy.

2.1 Business Case

According to the United States Department of Agriculture (USDA), poor nutrition is a leading cause of disease in the United States leading to major costs on its treatment (>$150B/year in obesity-related healthcare costs). It is associated with more than half a million deaths a year. Moreover, it is linked to an increased risk of obesity, diabetes, and heart disease, as well as broader consequences such as higher healthcare costs and lower productivity (USDA, 2025). Given this, the department assures that to make progress on these issues, Americans need equitable access to healthy foods that promote wellness.

As part of its corporate social responsibility and innovation strategy, FoodMart, a leading supermarket chain in the USA, launched a startup competition to identify forward-thinking initiatives that could enhance customer experience, increase product transparency, and support public health goals. FoodMart took this step with the intention to integrate public health, sustainability, and innovation.

This initiative not only supports local public health but also positions FoodMart to strengthen customer loyalty by offering tools that empower informed purchasing decisions, differentiate itself from competitors through innovation and transparency, leverage local government incentives for supporting small and medium sized enterprises, allows the company to align with public health initiatives and access potential partnerships or grants from public agencies interested in lowering healthcare costs and finally, drive long term value by aligning with consumer trends toward wellness and sustainability.

Through this startup competition, Innovation Consulting Group was selected to develop an application that delivers quick and accurate nutritional information to users, encouraging healthy purchasing habits.

The collaboration between FoodMart and Innovation Consulting Group represents a strategic alliance that creates tangible value for both organizations. FoodMart gains a competitive advantage by incorporating technology that not only enhances the shopping experience but also promotes healthier consumer habits. At the same time, Innovation Consulting Group consolidates its position in the tech and consulting ecosystem by leading a project with measurable social and business impact, demonstrating its capacity to deliver scalable and user-oriented digital solutions.

According to the agreement, the startup will provide the technical expertise and digital transformation required to develop the MVP of the application, while FoodMart will assume the financial investment and ensure access to its customer base. The total amount agreed upon for the project is USD 1,150,000, which will cover development, implementation, and testing costs. This investment represents a relatively low-risk opportunity to validate the concept and measure market acceptance before moving toward full deployment.

Overall, this partnership reflects a shared commitment to innovation, public health, and strategic growth. By aligning business goals with social value, both organizations strengthen their positioning in an increasingly data-driven and socially conscious market.

2.2 Project Framework

The following project will follow a hybrid methodology allowing for the application development to count on predictive methodology for phased such initiation and planning and adaptive (Agile) methodology for development and integration. As the following framework component chart:

Table 1: Project Framework table

PHASE	METHODOLOGY	KEY ACTIVTIES
Initiation & Planning	Predictive	Project Charter, Business Case, Scope Definition, Schedule & Cost Baselines, Risk & Quality Planning
AI model foundation	Predictive	Data acquisition, cleaning, annotation, model training & validation
Development & Integration	Agile	15 sprints (3 weeks each), backlog refinement, sprint planning, daily stand-ups, reviews, retrospectives
Marketing & Launch	Predictive	Campaign planning,, content creation and feedback
Documentation & Training	Predictive	User manuals, FAQs, knowledge transfer sessions
Project Closure	Predictive	Final report, lessons learned, administrative closure, stakeholder sign off

Including a multi tiered structure, the project sponsor (FoodMart CEO) is the one responsible for the strategic oversight, budget approval and final acceptance of deliverables. While the project manager and CTO will handle the overall coordination, schedule, cost control, risk management and stakeholder communication. Product Owner will handle backlog prioritization, validations and stakeholder alignment. And finally, cross functional development team will execute the interactive development, including developers, designers, data and QA specialists.
For the delivery strategy the project will deliver an MVP (minimum viable product) within 18 months, followed by a pilot launch in one of FoodMart's stores. This MVP should include:

- AI-powered food and barcode recognition
- AR overlays for nutritional and sustainability data
- Nutritional recommendations
- Supermarket dashboard
- Authentication mechanisms in ten MVP for the product.

Economic feasibility analysis:
The following information is based on financial projections and cost estimations developed for the partnership between FoodMart and Innovation Consulting Group:

- Project Duration: 18 months
- Total Revenue: USD 1,150,000.00
- Total Cost: USD 869,600.00
- Discount Rate: 15%

The project demonstrates strong economic feasibility based on the financial indicators obtained. The total contract value agreed with FoodMart amounts to USD 1,150,000, while the total estimated development and implementation cost is USD 869,600. This results in an expected net profit of USD 280,400, equivalent to a 32.2% return on investment (ROI). Considering the project's 18-month duration and a discount rate of 15% per year, the net present value (NPV) is estimated at approximately USD 210,000, and the internal rate of return (IRR) reaches around 17%, exceeding the minimum acceptable rate of return. These results confirm that the project is financially viable, offering positive returns and moderate risk exposure. Beyond profitability, the collaboration is expected to generate intangible benefits such as market visibility, strategic positioning, and the potential to expand into future technological partnerships.

3. Project initiation

This chapter defines the project's objectives and critical success factors. It includes strategic analysis tools (SWOT and PREN) and culminates in the creation of the Project Initiation Document, which formalizes the project's launch and outlines key elements such as scope, stakeholders, risks, and governance.

3.1 Project Objectives

Below are the objectives defined in SMART terms (Specific, Measurable, Achievable, Relevant, and Time-Bound):

- Develop an MVP (Minimum Viable Product) of the application within a maximum of 18 months, capable of automatically identifying fresh products (fruits, vegetables), providing nutritional information (calories, macronutrients, vitamins), and showing the benefits for each food identified.
- Integrate barcode scanning into the MVP by launch date, ensuring at least 90% accuracy in matching products to the nutritional database during pilot testing
- Achieve an adoption rate of at least 30% among customers who pilot the application during the first *8 weeks after the launch of the MV*P session duration exceeding 3 minutes and retention rate above 40%, measuring engagement and recurring use.
- Collect and analyze consumption and preference data from a minimum of 10,000 pilot users within the first 12 weeks of the pilot phase, producing at least one actionable marketing and supply insights report by the end of that period.
- Position the supermarket as a leading brand for healthy and sustainable food by increasing sales of targeted fresh products in pilot stores by 20% within the first quarter after MVP implementation, compared to the previous quarter’s baseline.
- By the end of the MVP development phase (18 months), integrate at least two existing AI technologies and one external nutritional database to enable automated food recognition and accurate nutritional information delivery.
- Demonstrate alignment with public health concerns and the supermarket’s strategic goals by incorporating at least three health-related features (e.g., daily nutritional tips, healthier alternatives, and sustainability scoring) into the MVP by launch date.

Later to the launch, the project team will evaluate the pilot results and user feedback to plan future iteration and potential full-scale rollout.

3.2 Critical Success Factors

- Quality of the AI Model: The app must accurately recognize products and provide reliable nutritional data.
- User Experience (UX/UI): To encourage adoption, the app’s use should be simple, fast, and engaging. Using Augmented Reality to display information will simply provide clarity and interaction by displaying nutritional and product information.
- Data Integration: Up-to-date nutritional databases and robust barcode scanning system.
- Data Sources: We must obtain all the data from supermarket products and food experts.

- Executive Commitment: Clear leadership and consistent communication between the sponsor and the consulting firm.
- Marketing and Communication: Internal (store staff) and external (customer) promotion to ensure high user awareness and interest levels.
- Compliance with applicable laws and data protection regulations in the country where the product is launched.
- Continuous improvement: the app must include mechanisms for collecting user feedback and usage data. Enabling iterative updates to the AI model, UX/UI, and features based on real-world insights and evolving user needs.
- Scalability and performance: the app must be designed to handle increasing user volumes and product categories without compromising speed or reliability.
- Accessibility: The app should be usable by individuals with varying levels of digital literacy and physical abilities. This includes support for multiple languages, voice interaction, and compatibility with assistive technology.

Project Management SWOT Analysis

Strengths	Weaknesses
Innovative technologies, combining AI and AR to deliver real time data Strong partnership between FoodMart and Innovative Consulting Group Compliance and Quality adhering to GDPR, CCPA, USDA standards Hybrid methodology to accommodate multiple aspects of the project Cross platform supporting also multiple languages and accessibility standards MVP Designed for future expansion beyond initial features and purpose	High integration demands risking performance issues Limited scope only including fruits and vegetables as products to be analyzed Resource dependency relying heavily on external vendors for nutrition data Expanded scope increased cost by 18% Expanded features increased testing and compliance complexity
Opportunities	**Threats**
Rising demand for health conscious and sustainable food apps Potential for grants and partnerships investment with health agencies New features enhancing engagement and monetization	Similar apps entering the market Delay or quality issues from outsourced providers Additional features may strain budget and timeline Nutrition labelling and data privacy laws may evolve and impact data

Promotes eco-friendly choices and supports local producers Enables personalized marketing and supply chain optimization	Engagement below expectation impacting ROI Scope changes and integration challenges could lead to cost and time extensions.

Project Management PREN Analysis

Potentiate	Reduce
I Ensure strict adherence to GDPR, CCPA, and USDA labeling laws to prevent legal exposure Make sure to follow QA protocols and performance benchmarks (e.g., 90% barcode accuracy, <2s response time) to prevent user dissatisfaction Integrated change management to prevent scope creep and budget overruns	Reduce reliance on single providers by creating a Clear outsourcing strategy and supplier evaluation Use of strategies to reduce user drop off such as usability testing, onboarding tutorials, and marketing campaigns reduce adoption risks Make use of contingency reserves, phased billing, and cost tracking reduce budget overruns and cash flow issues
Exploit	**Neutralize**
Active involvement of FoodMart, producers, and users through feedback loops, pilot testing, and transparent communication Agile sprints allow rapid iteration and integration of user-driven features Exploit market trends on wellness, sustainability, and tech-enhanced shopping to capitalize this interest Empowering users to make healthier, eco-conscious choices with real-time nutrition and sustainability data, personalized recommendations, and AR overlays	Legal advisors and nutrition experts ensure compliance with GDPR, CCPA, USDA labeling, and accessibility standards to neutralize regulatory risks Supplier selection matrices, SLAs, penalties, and guarantees ensure performance and reduce outsourcing risks for nullify vendor risks Implementation of Cloud service SLAs, failover backups, and automated testing neutralize downtime and performance issues

3.3 Project Charter

Table 2: Project Charter

GENERAL PROJECT INFORMATION

PROJECT NAME	PROJECT MANAGER	PROJECT SPONSOR

AI-based Nutrition Augmented Reality App for Supermarket Chains		Maribel Zapata – CTO	FoodMart - CEO
EMAIL	**PHONE**	**ORGANIZATIONAL UNIT(S)**	
Info@icg.com	+1(438)8384856	Innovative Consulting Group	
ESTIMATED COST: $869,600.00 USD	**EXPECTED START DATE**		**EXPECTED COMPLETION DATE**
		04/17/2025	09/26/2026

Note: The price and the estimated start and completion dates are for reference only. The actual budget and schedule will be defined in the Cost Management Plan and Schedule Management Plan.

PROJECT OVERVIEW

PROBLEM OR ISSUE	Rapidly growing mobile applications for food-related purposes seek the transformation in the relationships of users with food and how it relates to wellness. Most applications encourage users to count calories, lose weight, or track their other fitness regimes to improve their health behaviors. However, users are still demanding to know how food can protect them from diseases by showing its nutritional benefits and some of the environmental consequences of food, such as how it is grown, if pesticides are used, if the food is locally sourced, and CO2 emissions from transport. Most nutrition apps fail to promote nutritional education and sustainable food choices. Most apps provide nutrition information that is inaccessible, unengaging, impractical, and difficult to use for anybody interested in making an informed decision. Many users do not possess enough nutritional knowledge and therefore tend to rely on app suggestions without understanding their nutritional needs. This suggests an urgent need for apps that empower users to make sustainable and healthful decisions while helping educate the user. Therefore, this project addresses a critical problem: the lack of innovative, educational, and sustainable nutrition applications adapted for real-world use, especially in supermarkets, where food decisions are made. Using Artificial Intelligence (AI) and Augmented Reality (AR).
PURPOSE OF PROJECT	The present project has the objective of introducing to the food industry an application that will support conscious nutrition and sustainability, increase organic product consumption, support local producers to widespread their products, and reduce the contamination and waste of food products in the USA. The solution proposed above is intended for filling out the information gap regarding the healthy and environmentally friendly

	choices of users with the additional benefit of empowering users to feed local economies.
BUSINESS CASE	The project seeks to develop a mobile application that uses artificial intelligence and augmented reality to provide users with real-time information about fruits and vegetables from the FoodMart supermarket. The application will provide nutritional information, benefits for food consumption, and sustainability information to improve users' decisions toward a healthy, environmentally friendly lifestyle. It will also provide a supermarket's dashboard that will display user behavior and interactions. The idea is to position FoodMart as an innovative and technological supermarket, providing its customers with tools to make conscious and healthy choices. This initiative will also generate positive effects for the environment and the local economy. By increasing user engagement, boosting product sales (fruits and vegetables), and improving brand loyalty, the project is expected to generate long-term commercial value, promote sustainability, and fulfill social responsibility.
GOALS / METRICS	• Improve consumption trends of buyers and impact their lifestyle through conscious nutrition. • Increasing the percentage selling healthy product options by 20%. • Create a functional application that will support FoodMart increasing its competitiveness on the food industry market by 35%. • Food and barcode detection with 90% accuracy. • Achieve a 30% adoption rate, sessions lasting more than 3 minutes, and a 40% retention rate for users using the app. • Identify all fruits and vegetables available on FoodMart. • Achieve positive feedback with an app store rating above 4.2 out of 5 and positive feedback from 85% users. • Improve FoodMart's brand perception using satisfaction surveys with a rating above 4.2.
EXPECTED DELIVERABLES	An MVP of an application for Android and iOS that will provide information regarding nutritional and cultivating aspects of food available in the FoodMart chain of supermarkets. The application must contain the following features: • Food identification and barcodes using artificial intelligence models. • Personalized recommendations through artificial intelligence. • Login to maintain user security and privacy. • Augmented reality module integrated into the app to display real-time information. • Detailed information for each food item about how it affects health and nutritional information (calories, fats, proteins, carbohydrates,

	vitamins, minerals), sustainability information: CO2 emissions, packaging type (recyclable or not), growing areas, origin, and production type (organic or local). • Personalization module to select user preferences and the most relevant information to display. • Food and sustainability database including nutritional values, sustainability data, and user information for extracting inputs on recommendations. • Backend infrastructure provides a secure, scalable server to manage user information, databases, and artificial intelligence models. • Dashboard for the supermarket showing user engagement and retention, most scanned products, and behavioral changes (e.g., users choosing sustainable foods). • Marketing and launch plan, brand strategy, promotional materials, initial launch tasks, and user acquisition. • Technical documentation, user manuals and FAQs, maintenance and update guides.
REQUIREMENTS	Functional requirements: • The system must allow for account creation, login, and secure management of personal information. • Allow the user to scan a food item and barcode through the app using the camera to receive detailed information. • Detect food items in real time using artificial intelligence models. • Display nutritional, functional, and sustainability information about foods using augmented reality. • The user must be able to select preferences regarding dietary goals and a sustainability approach with the app. • Record scanned foods for user follow-up. • A dashboard for supermarkets showing information on the most scanned products, levels of engagement with the app, and behavioral trends. • The app must be functional on Android and iOS. Non-functional requirements • The camera must detect and identify items in less than 2 seconds. • The system supports simultaneous usage by 50000 users without problems. • All data must be encrypted using standard protocols like https and AES-256. • The application includes secure authentication and data privacy. • If the application fails, it must be recovered within 5 minutes.

	• The interface is simple and intuitive for the end user. • The app must give 99.5% uptime during business hours. • Regular database updates. • User data protection, privacy, and security. • Attractive and easy to use design for diverse users. • The architecture of the system shall permit the application of monthly updates without disrupting the service. • Documentation (user manual, API docs, and admin guide) must be maintained and updated in line with releases. • The system shall operate in compliance with U.S. food safety law, data tracking law, and consumer protection law.

PROJECT SCOPE

WITHIN SCOPE	• This project includes a secure server that manages user data and interaction history and a database system that stores product information, sustainability data, and user settings. • Deliver and develop a web dashboard for supermarkets, displaying metrics such as the most scanned product, user engagement levels with the app, and behavioral trends. • Deliver and define the marketing plan and promotional elements to promote the app and encourage users to download it, as well as highlight the supermarket's role as a differentiator in innovation and technology. • Deliver and develop all technical documentation, highlighting application functionality, architecture, and maintenance guides. Also deliver user manuals, FAQs, and support documentation for system updates.
OUTSIDE OF SCOPE	• Food delivery service functionality or order placement functions will not be covered in the app. • Integration of third-party services like payment gateways, the external shopping cart, or loyalty programs will not be provided. • Professional advice by nutritionists and healthcare professionals through in-app consultation will not be given by the app. • The initial scope of the project will only be focused on supermarkets and producers in the USA. Expansion to any other country or region will be out of scope for now. • The app will not be usable offline. Online scanning, AR, and data synchronization functionalities will require user internet connectivity to work. • The project will not cover any logistics around packing or delivery tracking for local producers or food items. • Processed foods are not included in the augmented reality application.

TENTATIVE SCHEDULE

KEY MILESTONE	DESCRIPTION	START	FINISH
PROJECT START	Official project kick-off and initial setup.	4/17/2025	4/17/2025
PROJECT MANAGEMENT & PLANNING	Continuous project management, monitoring, and coordination activities throughout the project lifecycle.	4/17/2025	09/26/2026
PRODUCT DISCOVERY & REQUIREMENTS	Stakeholder interviews, user research, competitive benchmarking, and specification definition.	4/17/2025	5/19/2025
AI MODEL FOUNDATION (CPMAI)	Dataset identification, collection, annotation, cleaning, EDA, transformation, PCA, dataset split, model training, evaluation, testing, and export for mobile integration.	5/19/2025	9/4/2025
DEVELOPMENT (AGILE SPRINTS)	Iterative sprint deliveries.	9/5/2025	06/01/2026
MARKETING & LAUNCH PREPARATION	Campaign planning, alignment of objectives/KPIs, target audience definition, stakeholder review, budget approval, and creation of promotional materials.	06/02/2026	07/03/2026
DOCUMENTATION & TRAINING	User documentation, FAQs, user manuals, training sessions, and knowledge transfer (KT) sessions.	07/06/2026	08/10/2026
PPROJECT COLOSING & ADMINSTRATIVE CLOSURE	Final project review, report preparation, KPI reporting, lessons learned, financial closure, vendor contract closure, archiving documentation.	08/11/2026	09/11/2026

FORMAL PROJECT ACCEPTANCE	Submission of final project report to stakeholders and obtaining formal sponsor sign-off.	09/14/2026	09/21/2026
PROJECT CLOSURE COMPLETE	All closure activities finalized and project formally closed.	09/22/2026	09/26/2026

RESOURCES

PROJECT TEAM

Project Sponsor	Provides financial support, defines strategic direction, and approves critical deliverables. This role will be fulfilled by the company's CEO, who will directly negotiate any changes.
Project Manager	Lead and control the project planning and execution. Manage scope, schedule, risks, and budget. This role will be fulfilled by the company's CTO, who will directly plan and manage the project.
Development Lead	Lead the team with technical tasks, architecture, and integration in the app, including database, augmented reality, machine learning, and artificial intelligence.
Mobile developer (Android, iOS)	Develop the mobile application with all features.
Backend Developer	Design and develop APIs, databases, and integration layers.
UX/UI Designer	Design the interface and user experience of the application.
AI/ML Engineer	Training and integrating artificial intelligence models for food and barcode recognition.
Data Analyst	Develop real-time food data visualizations.
QA Engineers	Perform testing, including functionality, usability, performance, and security.
Product Lead	Oversee and ensure a clear product vision and strategy, guaranteeing that all technical aspects and product features are properly executed.
Business Analyst	Get and define requirements for the supermarket. Support reporting analysis and stakeholder needs.

SUPPORT/ EXTERNAL RESOURCES

Legal advisor	Oversee and advise about data privacy and copyright.
Nutritionist	To provide and validate the nutritional information that will feed the application's data.
Marketing Company	To conduct market research based on consumer preferences, providing key insights for the app's development, and once the application is built, align the brand design and launch the advertising campaign.

SPECIAL NEEDS

Artificial Intelligence Training Data	Access to images and nutritional databases for training models.
Augmented reality SDK	Integration with frameworks like AR Core for Android and ARKit for iOS.
Test devices	Access to different types of smartphones to test compatibility and performance.
Security tools	Secure authentication during development like VPN, data encryption.
Develop tools	Some tools for development such as: Figma for design prototypes, GitHub (code repository), and Jira to create tickets and assign tasks.

TENTATIVE COSTS

Type	Description	Monthly Rate (USD)	Quantity	Months	Total (USD)
	Variable Cost				
Labor	CTO (Project Manager)	$ 7,000.00	0.65	20	$ 91,000.00
Labor	Product Lead	$ 6,000.00	0.5	20	$ 60,000.00
Labor	Business Analyst	$ 3,500.00	0.35	20	$ 24,500.00
Labor	Development Lead	$ 6,000.00	0.5	20	$ 60,000.00
Labor	AI/ML Specialist	$ 5,500.00	0.5	20	$ 55,000.00
Labor	Data Analyst	$ 3,500.00	0.3	20	$ 21,000.00
Labor	Backend Developer	$ 5,500.00	0.75	20	$ 82,500.00
Labor	Mobile Developer	$ 4,500.00	0.5	20	$ 45,000.00
Labor	UI/UX Designer	$ 3,500.00	0.4	20	$ 28,000.00
Labor	QA Engineer	$ 4,000.00	0.7	20	$ 56,000.00
Material	Software (Licenses)	$ 2,000.00		20	$ 40,000.00
Supplies	Others	$ 4,000.00	1	20	$ 80,000.00
Labor	Marketing Agency	$ 60,000.00	1	20	$ 60,000.00
Labor	Nutritionist	$ 15,000.00	1		$ 15,000.00
Miscellaneous	Fixed Cost	$ 2,000.00		20	$ 40,000.00
Total					**$758,000.00**
Contingency and management reserve			**20%**		**$151,600.00**
Total Budget					**$869,600.00**

BENEFITS AND CUSTOMERS

PROCESS OWNER	This person is responsible for monitoring the development and execution of the project. Also review that the processes are being executed correctly to achieve project success. If there is a failure in the process or the project is not successful, this person must make improvements to ensure all quality standards are met. He/She ensures that objectives, functional and non-functional requirements, and stakeholders are always aligned with the strategy. Approve the main deliverables and monitor critical aspects of the project.
STAKEHOLDERS	Supermarket (project sponsor), project manager, development team, UX/UI designers, AI/ML specialist, recruitment team, testers, admin team, financial team, legal department (for patent), external legal entities, local producer's community/associations, end user (consumers), marketing and market research partners.

FINAL CUSTOMER	FoodMart chain of supermarkets
EXPECTED BENEFITS	• Enhance the shopping experience, increase customer engagement, and attract a new segment of consumers interested in healthy and sustainable food products. • Increase sales and build customer loyalty. • Improve users' health and nutrition by providing them with food information to improve their choices. • Empower users to select more sustainable and fresh products by receiving information about CO2 emissions, packaging, production type, and product origin. • Provide an easy-to-use, intuitive, augmented reality app designed for all types of people that deliver relevant information. • Support and help the local economy and farmers. • The platform will be available on Android and iOS so that all users have access to food-related information.
DECISION MAKING PROCESS	• Operational decisions are made by the Project Manager in consultation with the Development Lead and Business Analyst. • Strategic decisions require approval from the Project Sponsor and Project Director.
ESCALATION PATH	1. Team Level Issues → Project Manager 2. Cross-functional or resource conflicts → Project Director 3. Strategic misalignment or budget/scope risks → Project Sponsor

DELIVERY STRATEGY

PHASE DEVLIVERY PLAN	**Planning & Requirements:** Finalize scope, schedule, cost, and quality baselines. Deliverables include the Project Management Plan, Requirements Specification, and Risk Register. **AI Model Foundation:** Data acquisition, cleaning, and model training using CPMAI methodology. **MVP Development:** 15 sprints of 3 weeks each, delivering incremental features including food recognition, barcode scanning, AR overlays, and user personalization. **Pilot Launch & Feedback:** Deploy MVP in selected stores, gather user feedback, and iterate based on findings. **Documentation & Training:** Deliver user manuals, training sessions, and technical documentation. **Project Closure:** Final report, lessons learned, and formal handover.
GOVERNACE & CONTROL	• Predictive phases will follow formal stage-gate reviews. • Agile phases will be governed by sprint planning, reviews, and retrospectives.

	• Integrated Change Control will be applied across both methodologies to manage scope, cost, and schedule changes
TOOLS	**Predictive:** Microsoft Project, Excel, Confluence **Agile:** Jira, Slack, GitHub, Figma

RISKS, CONSTRAINTS, AND ASSUMPTIONS

RISKS	• Market research results show negative engagement from the target audience. • Inefficiency in augmented reality functions. • Delay in training food identification models. • Delay in finding resources for functional food identification. • Delay in hiring the technical specialists needed to develop the app. • Technical limitations in integrating artificial intelligence with augmented reality technology in devices. • Producers are unwilling to provide food-related information. • Increase in budget due to unforeseen expenses related to product development.
CONSTRAINTS	• The project must last for 18 months. • Fixed and limited budget. • App compatible with Android and iOS. • Only FoodMart supermarket products are included. • Only fruits and vegetables are included; processed foods are not included.
ASSUMPTIONS	• Producers are willing to provide information about their food products. • Sustainability and nutrition information will come from reliable sources. • The app will be approved in digital stores (Google Play and the App Store). • Users have access to smartphones with cameras and internet access. • The supermarket has Wi-Fi access for users.
ACCEPTANCE CRITERIA	Technical Requirements: • App functions on both Android and iOS platforms. • AR and AI modules operate with expected performance benchmarks. • Backend infrastructure ensures secure data handling and scalability. Functional Requirements: • Users can scan food items and receive nutritional and sustainability data.

	• Producers can input product data via the web portal. • Supermarket dashboard displays user engagement and behavioral trends. Compliance & Documentation: • All data complies with U.S. food safety, privacy, and consumer protection laws. • Complete technical documentation, user manuals, and training guides are delivered. • MVP passes QA testing and pilot launch feedback is incorporated.

PROJECT AUTHORITY

PROJECT DIRECTOR	John Furner
APPROVAL REQUIREMENTS	Approval of: Project Charter, Requirement overview, Project Management Plan, Schedule Management Plan, Cost Management Plan, Mock Ups, AI prototypes, MVP

PREPARED BY	TITLE	DATE
Maribel Jaramillo	CTO and Project Manager	20/04/2025

4. Project Planning

A core section that details the planning of all major project components. It includes Stakeholder and scope management; schedule and cost planning; quality, resource, communication, risk, and procurement management.

Each subsection adapts to the chosen project approach and includes tools, techniques, and control mechanisms to ensure effective planning and execution.

4.1 Stakeholder Management Planning

This section will analyze the expectations and needs of various stakeholders involved in the project titled "AI-based Nutrition Augmented Reality App for Supermarket Chains." Additionally, we will develop effective management strategies to engage these stakeholders and ensure continuous communication throughout the project's lifecycle.

By actively involving stakeholders in project decisions and execution, the objective is to acquire their support while anticipating any potential conflicts or competing objectives. Also, the idea is to achieve the project's objectives efficiently and effectively.

Stakeholder Engagement Planning

The engagement strategy is designed to ensure that stakeholders are not only informed but actively involved in shaping the project outcomes, particularly in areas such as user experience, data validation, and strategic alignment with FoodMart’s sustainability goals.

Stakeholders such as the Project Sponsor (CEO of FoodMart), the Project Manager, Development Lead, Product Owner, and various specialists are classified using a power-interest matrix. This classification informs the level and type of engagement required, ranging from continuous involvement in decision-making to periodic updates and consultations.

Communication channels are selected to support engagement goals. These include structured formats like executive reports and steering committee presentations, as well as agile tools such as Jira, Slack for real-time collaboration. Engagement is also supported by onboarding materials, FAQs, and in-app messaging to ensure that users and producers understand the app’s functionality and contribute meaningfully to its refinement.

The engagement strategy is dynamic and evolves with the project lifecycle. During the predictive phases, engagement is focused on alignment, planning, and validation. In the adaptive phases, it shifts toward collaboration, iteration, and feedback. This ensures that stakeholder input is continuously integrated into the development process, enhancing both the relevance and quality of the final product.

Stakeholder Identification

To effectively manage stakeholders for the project, it is important to identify and assess them. This involves conducting a stakeholder analysis to gather information on their interests, involvement, influence, and impact on the project's success. We are creating a Stakeholder

Analysis Register categorized by group, which will capture essential details about each stakeholder, helping us understand their role in the project.

The Stakeholder Analysis Register will include the following information:

- Project Role
- Influence Level on Project
- Level of Impact on the Project

Table 3: Stakeholder Identification

Project Role	Power of influence	Power of interest
CEO FoodMart (Project Sponsor)	High	High
Project Manager	High	High
Development Lead	High	High
Mobile developers	Medium	High
Backend Developers	Medium	High
UX/UI Designer	Medium	High
AI/ML Specialist	Medium	High
AR Developer	Medium	High
Nutrition Expert	Medium	Medium
Local producer Lead	Medium	Medium
Business Analyst	Medium	Medium
Recruitment Team	Low	Medium
QA Engineers	Medium	Medium
UI/UX Testing Volunteers	Medium	Medium
Administrative Team	Low	Low
Financial Team	Medium	Medium
Legal Department	Medium	Medium
External Legal Entities	Medium	Low
Marketing Team	Medium	High
Final Users (Consumers)	Medium	High

Power/Interest Classification

Once all stakeholders for the project have been identified, the project team will analyze each group's position to assess their level of power and influence. The goal of the Power/Interest Matrix is to pinpoint the most influential and affected stakeholder groups. This will allow for the development and implementation of a targeted stakeholder management strategy and plan.

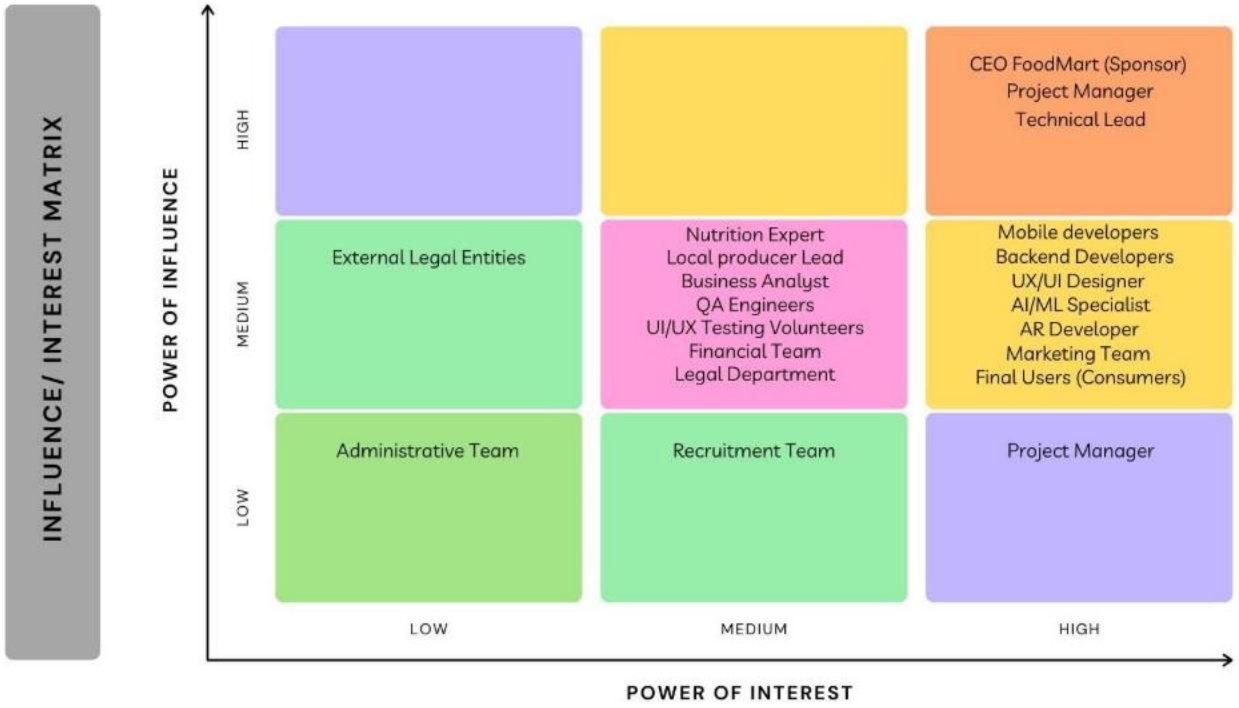


Figure 1. Influence/interest Matrix

Table 4: Stakeholder & Action Plan Strategy

Stakeholder	Influence Level	Interest Level	Action Plan and Strategy
CEO FoodMart (Project Sponsor)	High	High	Continuous involvement in key decision-making, biweekly executive meetings, and a progress report that provides full project visibility.
Project Manager	High	High	Engage continuously in key decision-making, oversee overall coordination, conduct daily 15-minute meetings, and perform risk management analysis.
Development Lead	High	High	Consistent participation in essential decision-making, architectural design, technical support, and code review.
Mobile developers	Medium	High	Frequent meetings for implementation, AI & AR integration.
Backend Developers	Medium	High	Frequent meetings to review API development and backend infrastructure.
UX/UI Designer	Medium	High	Regular meetings, user experience workshops, and design reviews.
AI/ML Specialist	Medium	High	Frequent meetings to review model design and training, accuracy testing, and ethical compliance.
AR Developer	Medium	High	Dev Syncs, Jira, Demo Reviews

Nutrition Expert	Medium	Medium	Keep informed on project updates regarding the scientific validation of nutritional content.
Local producer Lead	Medium	Medium	Keep informed about general project updates for the validation of local product information and nutritional data.
Business Analyst	Medium	Medium	Keep informed about general project updates to align with business requirements for defining KPIs.
Recruitment Team	Low	Medium	Stay updated on general project developments, specifically regarding the hiring of technical staff.
QA Engineers	Medium	Medium	Regular updates, coordination with developers.
UI/UX Testing Volunteers	Medium	Medium	Regular updates, coordination in usability testing, post-test survey.
Administrative Team	Low	Low	Only include updates when necessary; keep informed about general project updates for internal logistics support or documentation.
Financial Team	Medium	Medium	Periodic reports must concentrate exclusively on key financial metrics that drive our success.
Legal Department	Medium	Medium	Periodic reports involve only the critical legal aspects of ensuring national and international laws compliance.
External Legal Entities	Medium	Low	Periodic reports will concentrate solely on critical points regarding compliance with national and international aspects.
Marketing Team	Medium	High	Regular updates of launch strategy
Final Users (Consumers)	Medium	High	Onboarding surveys

4.2 Scope Management Planning

This project encompasses the design and development of a cross-platform mobile MVP application that finds its way onto Android and iOS, enabling users to create accounts and log in securely. The app will support scanning food (fruits and vegetables) using the device camera to identify food items and barcodes, with an AI for real-time food recognition. Augmented Reality (AR) will display detailed information on the food, such as nutritional value, functional properties, and sustainability data. Users will be able to customize their experience according to dietary goals and sustainability preferences. The app will keep track of the scanned foods to assist users with tracking their consumption history and behavior.

Within the project we can expect in scope:

- MVP development for Android and iOS
- AI model training and integration

- AR module development
- Backend and database setup
- Marketing materials and launch plan
- Documentation and training sessions

Whereas out of scope:

- Food delivery or order placement features
- Integration with third-party payment or loyalty systems
- Professional nutritionist consultations via app
- Offline functionality
- Expansion beyond the USA
- Processed food recognition
- Producers can input product data via the web portal.

Scope Planning Methodology

A hybrid approach will be used blending Predictive and adaptative (Agile) methodologies to suit the unique demands of the app development. This is will enable the user driven development of the application still following a structured planning approach.

The predictive methodology will be applied to the phases of the project that require a high degree of structure, control, and regulatory compliance. These include the initial planning and initiation stages, where the project scope, budget, schedule, and governance structures are defined. It also encompasses the requirements gathering phase, which involves stakeholder interviews, competitive benchmarking, and formal documentation of functional and non-functional specifications. The AI model foundation phase, is another area where a linear, sequential process is beneficial. This phase involves data collection, cleaning, annotation, and model training—activities that demand precision and traceability. Additionally, the documentation and training phase, as well as the final project closure, are best managed through a predictive approach to ensure completeness, compliance, and stakeholder sign-off.

During the development of the application, integration with augmented reality features, and enhancements of user experience Agile methodology will be implemented. That way, allowing the team to respond dynamically to user needs, stakeholder inputs and technical discoveries. Through sprints, user stories, and backlog refinement, the team can deliver incremental value, validate features early, and adjust priorities as needed. By combining these two methodologies, the project ensures both technical rigor and creative agility. Within the agile framework, key ceremonies such as daily stand-ups, sprint planning, reviews, and retrospectives will be implemented. The Product Owner will be responsible for prioritizing the backlog and ensuring alignment with the supermarket's strategic objectives, while the Scrum Master will facilitate the agile process and support the team in removing obstacles.

This hybrid approach allows us to obtain the strengths of both models: the robustness, traceability, and control of predictive management, along with the agility and incrementality of the agile

approach. It is especially suitable for projects that combine technological innovation, social impact, and regulatory requirements, as in this case, where both rigorous documentation and the ability to respond to emerging market and user needs are required.

Scope Validation and Control

Scope validation of the project will be conducted through formal sign off at key milestones, acceptance testing against defined acceptance criteria, constant stakeholder reviews during sprint demos and pilot evaluations and traceability matrix to ensure all requirements are met.

For control the scope will count on a variety of mechanisms including integrated change control process highlighted later in this document, sprint planning as well as escalation path for unresolved issues counting (team, project manager, project director, sponsor).

Scope Documentation

For the predictive section, the requirement documentation, project scope statement, Work Breakdown Structure and WBS dictionary will serve as reference.

WBS Diagram

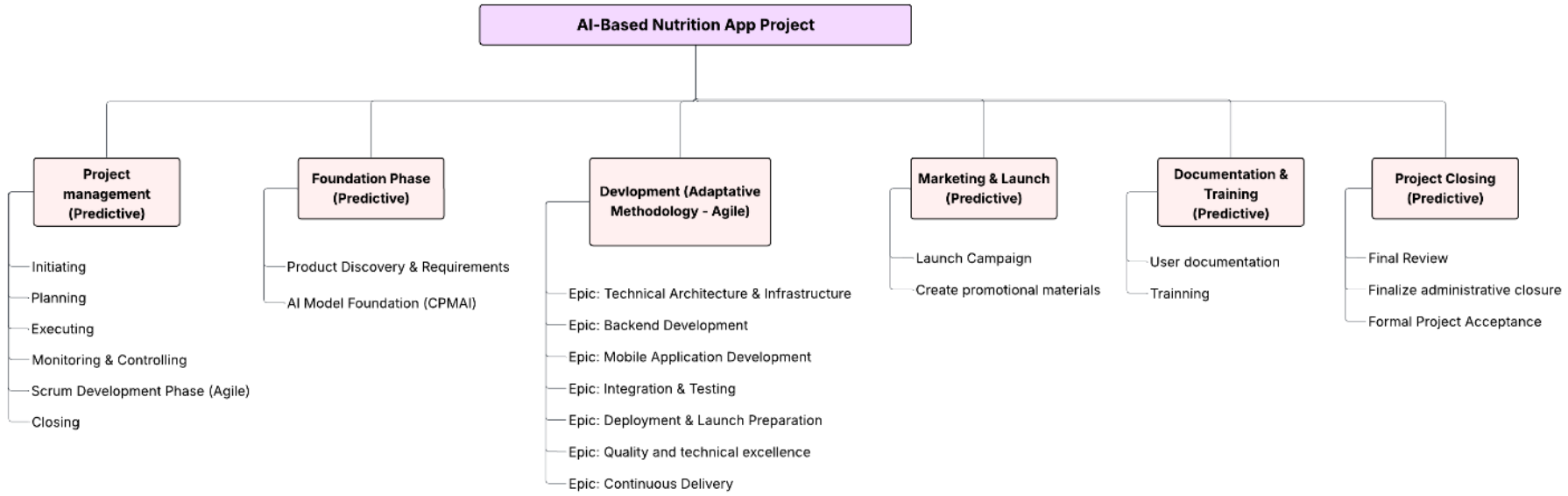


Figure 2. WBS Diagram

WBS

Table 5: WBS

PROJECT SCOPE STATEMENT				
WBS ID	**WBS COMPONENT NAME**	**WBS SUBCOMPONENT**	**ACTIVITIES**	**DELIVERABLE LINKED**
1	Project management (Predictive)	1.1 Initiating	Kick-off Meeting	Assumptions Document
				Stakeholders Identification Document
		1.2 Planning	Create the Project Management Plan	Scope Management Plan
				Requirements Management Plan
				Schedule Management Plan
				Time Management Plan
				Cost Management Plan
				Quality Management Plan
				Procurement Management Plan
				Resource Management Plan
				Risk Management Plan
				Stakeholder Management Plan
				Communication Management Plan
		1.3 Executing	Train and manage the team	Change Requests Document
			Assign the activities to each team member	Team Members Assessment Report
			Assign the activities to each member	Meetings
		1.4 Monitoring & Controlling	Create evaluation documents to present the progress of the project	Monitoring Report

PROJECT SCOPE STATEMENT				
WBS ID	**WBS COMPONENT NAME**	**WBS SUBCOMPONENT**	**ACTIVITIES**	**DELIVERABLE LINKED**
			Feedback sessions with the client	Change Requests Document
			Evaluate the execution of the project	Lessons Learned Document
		1.5 Scrum Development Phase (Agile)	Scrum Framework Setup	
			Product Backlog Management	
			Sprint Execution	
			Quality and technical assurance - testing	
		1.6 Closing	Meet the client to close the project	Closing Report
			Create the final documentation	Administrative Documents
			Sign the handover document	Lessons Learned Document
2	Foundation Phase (Predictive)	2.1 Product Discovery & Requirements	Conduct stakeholder interviews	Interview transcript
			Prepare interview transcript	Draft software requirement
			Conduct user research	Product-Market Fit (PMF) document
			Analyze user research findings	Competitive benchmarking report
			Conduct competitive benchmarking	Market analysis report
			Define the specifications of the product	Users summary document
		2.2 AI Model Foundation (CPMAI)	Identification of available dataset	Present the different datasets and databases
			Collect and consolidate relevant food-related data	Dataset details document

PROJECT SCOPE STATEMENT				
WBS ID	**WBS COMPONENT NAME**	**WBS SUBCOMPONENT**	**ACTIVITIES**	**DELIVERABLE LINKED**
			Annotate and label food items	Merge all the important databases
			Exploratory Data Analysis (EDA)	Data overview report with descriptive statistics and main insights
			Data cleaning: outliers, NA, duplicates, inconsistencies, etc.	Cleaned data set
			Data transformation: type conversion, scaling and normalization, etc.	Data set with standardized and normalized data
			Principal Component Analysis for dimensionality reduction	Data set with relevant variables
			Split dataset (training, validation, testing)	Deliver the cleaned data
			Measure accuracy and precision	Model Accuracy Results
			Generate confusion matrix	Confusion Matrix
			Conduct testing	Report presenting the results
			Export the model to integrate with mobile development (TensorFlow Lite)	Model with the format for mobile development
3	Development (Adaptative Methodology - Agile)	Epic: Technical Architecture & Infrastructure	Sprints 1-3	CI/CD pipeline, cloud environment, API skeleton, automated tests.
		Epic: Backend Development	Sprints 2-6	Integrated TensorFlow Lite model, API endpoints, real-time inference.

PROJECT SCOPE STATEMENT				
WBS ID	**WBS COMPONENT NAME**	**WBS SUBCOMPONENT**	**ACTIVITIES**	**DELIVERABLE LINKED**
		Epic: Mobile Application Development	Sprints 2-8	Business logic, REST APIs, authentication services.
		Epic: Integration & Testing	Sprints 3-11	iOS/Android front-end, ARKit/ARCore setup, secure login.
		Epic: Deployment & Launch Preparation	Sprints 1-15	Automated test suites, security scans, performance monitoring.
		Epic: Quality and technical excellence	Sprints 7-13	Beta builds, release notes, telemetry dashboards.
		Epic: Continuous Delivery	Sprints 12-15	MVP pilot release, load/performance tests, app-store submission package.
4	Marketing & Launch (Predictive)	4.1 Launch Campaign	Align campaign objectives and KPIs	Campaign strategy document
			Identify target audience and personas	Presentation for the stakeholders
			Stakeholder Engagement Review	Survey
		4.2 Create promotional materials	Design visual assets	Flyers
			Define copy for materials	Banners
5	Documentation & Training (Predictive)	5.1 User documentation	Create manual for the users	User manual
			List frequent asked questions	FAQs
		5.2 Training	User manual	Guidelines and documentation
			Knowledge Transfer (KT) sessions	Training plan
6	Project Closing (Pr	6.1 Final Review	Prepare final project report	Final report

PROJECT SCOPE STATEMENT				
WBS ID	**WBS COMPONENT NAME**	**WBS SUBCOMPONENT**	**ACTIVITIES**	**DELIVERABLE LINKED**
			Create KPI (Key Performance Indicators) report	KPI Report
			Conduct lessons learned session	Lessons learned
		6.2 Finalize administrative closure	Archive all project documentation	Archived documentation
			Review and close vendor contracts	Legal acceptance document
			Finalize Financial Accounts and Payments	Finance report acceptance
			Finalize contract closure documents	Contract closure documents
		6.3 Formal Project Acceptance	Submit final project report to stakeholders	Final Project report and Handover of the project
			Obtain formal sign-off from project sponsor	Sponsor Approval/signature
			Closure	

WBS Dictionary

Table 6: WBS Dictionary

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
1	**Project Management (Predictive)**				
1.1	Initiating	Conduct kick-off meeting, identify stakeholders, and define high-level assumptions.	Project Manager/CTO	Stakeholder Register, Assumptions Log	Stakeholder list validated and approved.
1.2	Planning	Develop all management plans (scope, schedule, cost, risk, procurement, etc.).	Project Manager/CTO	Complete Project Management Plan	Plan approved by governance body.
1.3	Executing	Manage team, assign tasks, and execute planned activities.	Project Manager/CTO, Product Lead	Meeting Notes, Change Requests	Team tasks tracked and changes logged.
1.4	Monitoring & Controlling	Track progress, manage issues, and update stakeholders.	Project Manager/CTO	Monitoring Report, Change Log	Reports shared and reviewed in weekly meetings.
1.5	Closing	Conduct final review and administrative closure.	Project Manager/CTO	Closing Report, Lessons Learned	Sponsor signs final closure report.
2	**Foundation Phase (Predictive)**				
2.1	**Product Discovery & Requirements**				
2.1.1	Conduct stakeholder interviews	Interview key stakeholders to gather insights, requirements, and expectations for the product.	Project Manager/CTO	Interview transcript	All key stakeholders interviewed; transcript approved by Project Lead.

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
2.1.2	Prepare interview transcript	Document and summarize the stakeholder interviews into a clear transcript for analysis.	Product Lead	Draft software requirement	Transcript captures all relevant information and is approved by Product Lead.
2.1.3	Conduct user research	Collect data on user needs, pain points, and behaviors through surveys, interviews, or observations.	Business Analyst	Product-Market Fit (PMF) document	Research findings validated; PMF document reviewed and approved by Product Lead.
2.1.4	Analyze user research findings	Evaluate and synthesize user research to identify key insights and actionable requirements.	Business Analyst	Competitive benchmarking report	Analysis aligns with research data; insights validated by Product Lead.
2.1.5	Conduct competitive benchmarking	Analyze competitors' products, features, and market positioning.	Product Lead	Market analysis report	Report is complete, accurate, and approved by Product Lead.
2.1.6	Define the specifications of the product	Create a detailed summary of product specifications based on research and benchmarking. Document functional and non-functional requirements for the AI-based Nutrition App.	Marketing Agency (Contractor) / Product Lead	Users summary document. Software requirement definition document	Specification document reviewed and approved by stakeholders. Requirements are complete, clear, and validated by all stakeholders.
2.2	**AI Model Foundation (CPMAI)**				
2.2.1	Identification of Available Datasets	Identify open-source and commercial nutritional datasets.	AI/ML Specialist, Business Analyst	List of available datasets and databases	Dataset sources approved by data science lead.

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
2.2.2	Data Collection & Consolidation	Gather and merge relevant food-related data.	AI/ML Specialist, Nutritionist	Dataset details document	All sources consolidated with no missing critical fields.
2.2.3	Annotate and Label Food Items	Assign labels to food items for classification and analysis.	Nutritionist	Annotated and labeled dataset	Validation report approved by data science lead.
2.2.4	Exploratory Data Analysis (EDA)	Analyze datasets to identify trends, correlations, and anomalies.	Data Analyst	Data overview report with descriptive statistics and main insights	Report provides clear insights into data distribution, patterns, and quality issues.
2.2.5	Data Cleaning & Transformation	Clean, normalize, and prepare data for AI training.	Data Analyst	Cleaned dataset	No duplicates, null values, or inconsistent entries; all transformations logged.
2.2.6	Data Transformation	Standardize data formats and normalize features for model input.	Data Analyst	Standardized and normalized dataset	All data fields converted to correct types; scaling and normalization verified.
2.2.7	Principal Component Analysis (PCA)	Reduce dimensionality while preserving variance.	AI/ML Specialist	Dataset with relevant principal components	Selected components explain ≥90% of variance.
2.2.8	Split Dataset	Partition data into training, validation, and testing sets.	AI/ML Specialist	Training, validation, and testing datasets	Splits are randomized and balanced; no overlap between sets.
2.2.9	Model Training	Train AI/ML model with training dataset.	AI/ML Specialist	Trained model	Model meets pre-defined accuracy and performance targets.
2.2.10	Measure Accuracy and Precision	Evaluate model performance using standard metrics.	AI/ML Specialist	Model accuracy results	Accuracy, precision, recall, and F1-score meet minimum thresholds.
2.2.11	Generate Confusion Matrix	Provide detailed performance visualization for classification.	AI/ML Specialist	Confusion matrix	Matrix matches evaluation metrics and highlights correct vs. incorrect classifications.
2.2.12	Conduct Testing	Validate model performance in simulated or real-world scenarios.	QA Engineer	Test report presenting results	Model performs consistently under expected conditions.
3	**Development (Agile)**				

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
3.1	Epic: Technical Architecture & Infrastructure	Setup CI/CD pipeline, cloud environment, and system architecture.	Product Lead as Product Owner Project Manager/CTO (as Scrum Master if needed) Backend Developer Development Lead Mobile Developer QA Engineer UX/UI Designer AI/ML Specialist Business Analyst Data Analyst	CI/CD Pipeline, Cloud Environment Setup	Infrastructure tested and deployed successfully.
3.2	Epic: Backend Development	Develop APIs, integrate AI model, manage data processing.		Backend APIs, Integrated Model	All APIs pass unit and integration tests.
3.3	Epic: Mobile Application Development	Develop Android/iOS app, UI/UX, authentication, and AR integration.		Functional Mobile App	App passes usability and acceptance testing.
3.4	Epic: Integration & Testing	Integrate backend, AI model, and frontend; perform QA testing.		Integration Report, Test Results	No critical defects; all features verified.
3.5	Epic: Quality and Technical Excellence	Conduct code reviews, performance testing, and optimization.		QA Report, Performance Results	Meets defined performance KPIs.
3.6	Epic: Continuous Delivery	Prepare MVP pilot release and deployment to app stores.		MVP Release Package	MVP approved for release; deployed successfully.
4	**Marketing & Launch (Predictive)**	Create marketing strategy, design materials, and run the launch campaign.	Marketing Agency (Contractor), Product Lead	Campaign Strategy Document, Visual Assets	Marketing materials approved by stakeholders.
4.1	**Launch Campaign**				
4.1.1	Align Campaign Objectives and KPIs	Define overall campaign goals, success metrics, and performance indicators.	Marketing Agency (Contractor), Product Lead	Campaign strategy document	Objectives and KPIs reviewed and approved by stakeholders; measurable and aligned with business goals.
4.1.2	Identify Target Audience and Personas	Research and define audience segments and personas for targeted marketing.	Marketing Agency (Contractor)	Presentation for the stakeholders	Personas validated with supporting data; stakeholders confirm alignment with campaign goals.
4.1.3	Stakeholder Engagement Review	Gather feedback and input from key stakeholders	Product Lead	Stakeholder survey	Survey results collected and analyzed; feedback incorporated into campaign plan.

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
		regarding campaign direction.			
4.2	**Create promotional materials**				
4.2.1	Design Visual Assets	Create graphics, banners, and visual materials for campaign promotion.	Marketing Agency (Contractor)	Flyers, visual materials	Assets meet brand guidelines, stakeholder approval obtained, ready for deployment.
4.2.2	Define Copy for Materials	Write compelling copy for banners, emails, social media posts, and other materials.	Product Lead	Banners, marketing copy	Copy aligns with brand messaging, approved by stakeholders, and ready for production.
5	**Documentation & Training (Predictive)**				
5.1	**User documentation**				
5.1.1	Create Manual for Users	Develop a comprehensive manual guiding users on system functionality and processes.	UX/UI Designer, Business Analyst	User manual	Manual is clear, complete, and validated by stakeholders; includes screenshots and step-by-step instructions.
5.1.2	List Frequently Asked Questions	Compile common user questions and provide accurate answers for quick reference.	Product Lead	FAQs	FAQs are reviewed for accuracy, cover all major topics, and approved by stakeholders.
5.2	**Training**				
5.2.1	User Manual Review and Approval	Ensure all documentation meets quality standards and provides consistent guidance.	Project Manager/CTO	Guidelines and documentation	Documentation is reviewed, errors corrected, and approved by the project manager/CTO.
5.2.2	Knowledge Transfer (KT) Sessions	Conduct training sessions for end-users or internal teams to transfer knowledge effectively.	Project Manager/CTO	Training plan and session materials	Sessions completed as scheduled; participants confirm understanding and capability to perform tasks independently.
6	**Project Closing (Predictive)**				

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
6.1	**Final Review**				
6.1.1	Prepare Final Project Report	Compile all project outcomes, achievements, metrics, and key learnings into a comprehensive report.	Business Analyst	Final report	Report reviewed for completeness and accuracy; approved by project manager.
6.1.2	Create KPI (Key Performance Indicators) Report	Summarize performance metrics measured during the project, comparing targets vs. actuals.	Business Analyst	KPI report	KPIs validated and approved; reflects project performance accurately.
6.1.3	Conduct Lessons Learned Session	Organize a session to review successes, challenges, and areas for improvement.	Project Manager/CTO	Lessons learned document	Session completed with participation from key stakeholders; lessons documented and distributed.
6.2	**Finalize administrative closure**				
6.2.1	Archive All Project Documentation	Store all project-related documents, deliverables, and artifacts for future reference.	Project Manager/CTO	Archived documentation	All relevant documentation stored securely; accessible for audits or future projects.
6.2.2	Review and Close Vendor Contracts	Ensure all vendor obligations are fulfilled and contracts formally closed.	Project Manager/CTO	Legal acceptance document	Vendor contracts formally signed off and closed; no pending obligations.
6.2.3	Finalize Financial Accounts and Payments	Reconcile all project financial transactions, payments, and invoices.	Project Manager/CTO	Finance report acceptance	Financial accounts reconciled; report approved by finance department.
6.2.4	Finalize Contract Closure Documents	Prepare all documentation required to formally close contracts with vendors or stakeholders.	Project Manager/CTO	Contract closure documents	All closure documents signed and stored; verified by legal team.
6.3	**Formal Project Acceptance**				

WBS ID	Component Name	Description / Scope	Responsible Role(s)	Deliverable(s)	Acceptance Criteria
6.3.1	Obtain Formal Sign-off from Project Sponsor	Secure official approval from the project sponsor to formally close the project.	Project Manager/CTO	Sponsor approval/signature	Sponsor provides formal sign-off; project officially closed.
6.3.2	Closure	Complete all remaining administrative and project closure activities.	Project Manager/CTO	N/A	All closure activities completed; project officially archived and closed.

For the predictive model, a high-level roadmap was designed to guide the development process. The high-level roadmap aims to build a solid technical foundation, integrate the AI model, develop the mobile application, and ensure quality and readiness for the pilot launch.

High-level roadmap:

Table 7: Roadmap

Focus area	Description	Key Deliverables	Expected Outcomes
Technical Architecture & Infrastructure	Establish core architecture, CI/CD pipelines, secure cloud backend, and foundational APIs.	CI/CD pipeline, Cloud environment, API skeleton, Automated unit/integration tests	Development and stable environment, Reproducible builds and secure deployments, Foundation ready for all components
AI Model Development & Integration	Build and integrate AI model for real-time food recognition and nutrition data retrieval.	TensorFlow Lite model, API endpoints for inference, Model-serving pipeline, Incremental retraining	Validated inference accuracy, Integrated AI pipeline, AI core operational within app
Backend Development	Develop scalable backend services and databases with robust security and telemetry.	Business logic, Auth and user services, Telemetry schema, Feedback/analytics endpoints	Reliable, scalable backend, Data capture for retraining, Backend supports MVP
Mobile Application Development	Build AR-enabled iOS/Android app to scan produce/barcodes and show nutrition info.	ARKit/ARCore integration, Secure login, Recognition UI, UX polish	Functional mobile MVP, User-ready experience, Pilot-ready AR app
Quality & Technical Excellence	Continuous focus on automation, security, and performance across the lifecycle.	Automated test suites, Security scans, Performance monitoring, Accessibility verification	Continuous quality validation, Stable and secure releases, Consistent app stability
Continuous Delivery & Deployment Prep	Enable automated delivery, beta distribution, and monitoring for pilot releases.	Staging deployments, Feature flagging, Release notes	Streamlined deployments, Controlled beta rollout, Operational readiness for pilot

Integration & Final Hardening	Final stabilization and packaging of MVP for pilot launch and app-store submission.	MVP pilot release, Load/performance testing, App-store submission artifacts	Fully integrated system, App ready for store release, Pilot launch complete

4.3 Schedule Management Planning

Overview

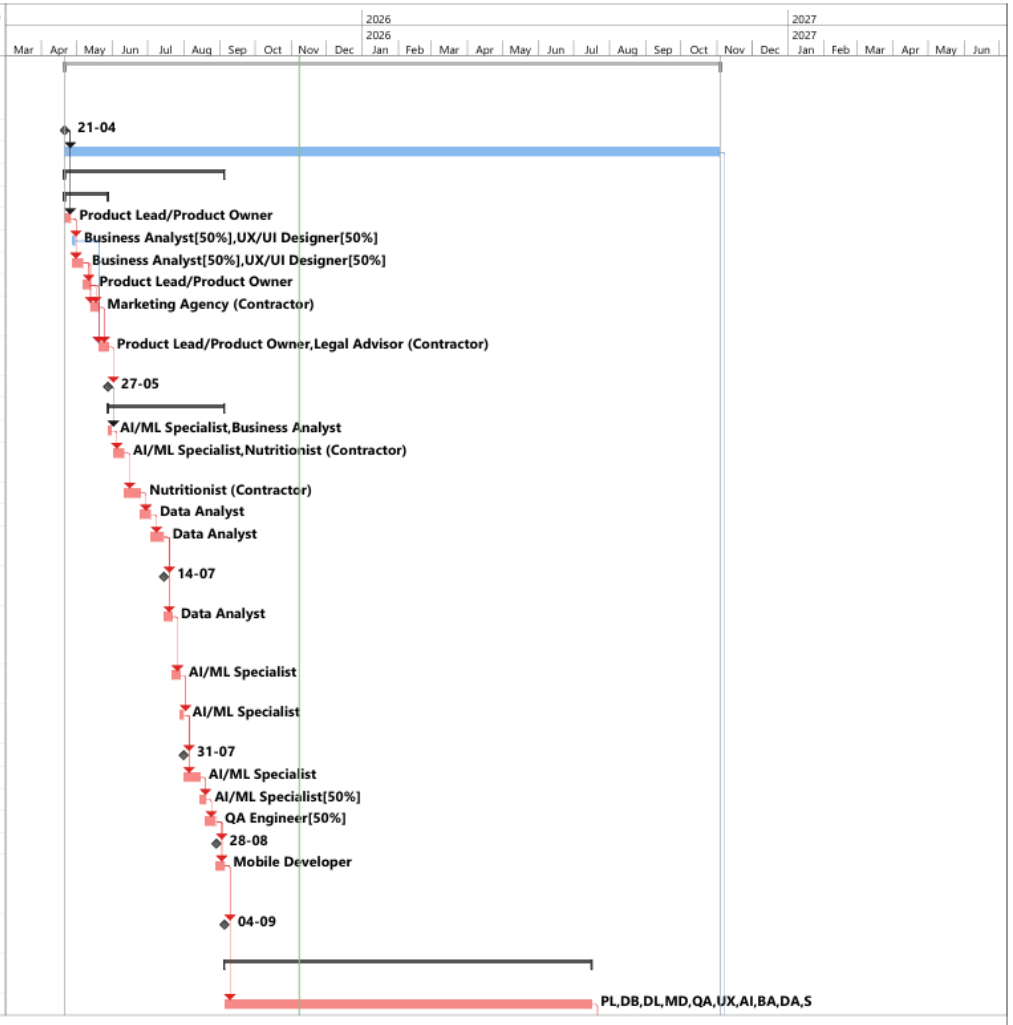
The project, with execution going on from April 21 of 2025 to November 03 of 2026 and approved budget of USD 823,360.11 (including reserves) having a core team of 10 to 12 specialists: Project Manager, development Lead, mobile developers, a backend developer, an AI/ML engineer, an AR developer, a UX/UI designer, a QA engineer, a business analyst, plus marketing, legal, and nutrition experts as needed for support.

The hybrid scheduling approach combines structured guidance from the PMBOK to enable sound preliminary planning and rapid adaptation. For predictive activities such as initiation, planning, requirements definition, AI development, piloting, and closure, the team uses Microsoft Project with a detailed Gantt chart to capture dependencies and show the critical path. The team uses Scrum practices, such as sprint boards, backlog grooming, and short cadences, to manage work and respond quickly to feedback for iterative development, AI optimization, and continuous delivery activities.

Mobile app development embraces iterative design and development following Scrum for the design and development of augmented-reality features and integration with AI model, with all developments tracked in Jira through a release roadmap consisting of 15 sprints, detailed user-story maps, and burndown charts in real time, thus enabling continuous delivery and fast adaptation.

Gantt Diagram with milestones

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
0		**AI-based Nutrition Augmented Reality App for Supermarket Chains**	**402 days**	**21-04-25**	**03-11-26**	
1		1 Start	0 days	21-04-25	21-04-25	
2		2 Project Management	401 days	21-04-25	02-11-26	1
3		**3 Foundation Phase**	**99 days**	**21-04-25**	**04-09-25**	
4		**3.1 Product Discovery & Requ**	**27 days**	**21-04-25**	**27-05-25**	
5		3.1.1 Conduct stakeholder ir	5 days	21-04-25	25-04-25	1
6		3.1.2 Prepare interview tran	2 days	28-04-25	29-04-25	5
7		3.1.3 Conduct user research	7 days	28-04-25	06-05-25	5
8		3.1.4 Analyze user research	4 days	07-05-25	12-05-25	7
9		3.1.5 Conduct competitive bechmarking	5 days	13-05-25	19-05-25	7,8
10		3.1.6 Define the specifications of the	6 days	20-05-25	27-05-25	6,8,9
11		3.1.7 Software Requirement	0 days	27-05-25	27-05-25	10
12		**3.2 AI Model Foundation (CPN**	**72 days**	**28-05-25**	**04-09-25**	
13		3.2.1 Identification of availa	3 days	28-05-25	30-05-25	11
14		3.2.2 Collect and consolidate relevant	7 days	02-06-25	10-06-25	13
15		3.2.3 Annotate and label foc	10 days	11-06-25	24-06-25	14
16		3.2.4 Exploratory Data Analy	7 days	25-06-25	03-07-25	15
17		3.2.5 Data cleaning: outliers, NA, duplicates,	7 days	04-07-25	14-07-25	16
18		3.2.6 Data consolidation and preparation complete	0 days	14-07-25	14-07-25	17
19		3.2.7 Data transformation: type conversion, scaling and normalization, etc.	5 days	15-07-25	21-07-25	17
20		3.2.8 Principal Component Analysis for dimensionality	5 days	22-07-25	28-07-25	19
21		3.2.9 Split dataset (training, validation, testing)	3 days	29-07-25	31-07-25	20
22		3.2.10 Dataset Split & Ready	0 days	31-07-25	31-07-25	21
23		3.2.11 Measure accuracy an	10 days	01-08-25	14-08-25	21
24		3.2.12 Generate confusion r	3 days	15-08-25	19-08-25	23
25		3.2.13 Conduct testing	7 days	20-08-25	28-08-25	24
26		3.2.14 Model testing compl	0 days	28-08-25	28-08-25	25
27		3.2.15 Export the model to integrate with mobile development (TensorFlow	5 days	29-08-25	04-09-25	25
28		3.2.16 Model exported for mobile integration	0 days	04-09-25	04-09-25	27
29		**4 Development (Adaptative Methodgy Agile)**	**225 days**	**05-09-25**	**16-07-26**	
30		4.1 Sprints	225 days	05-09-25	16-07-26	27



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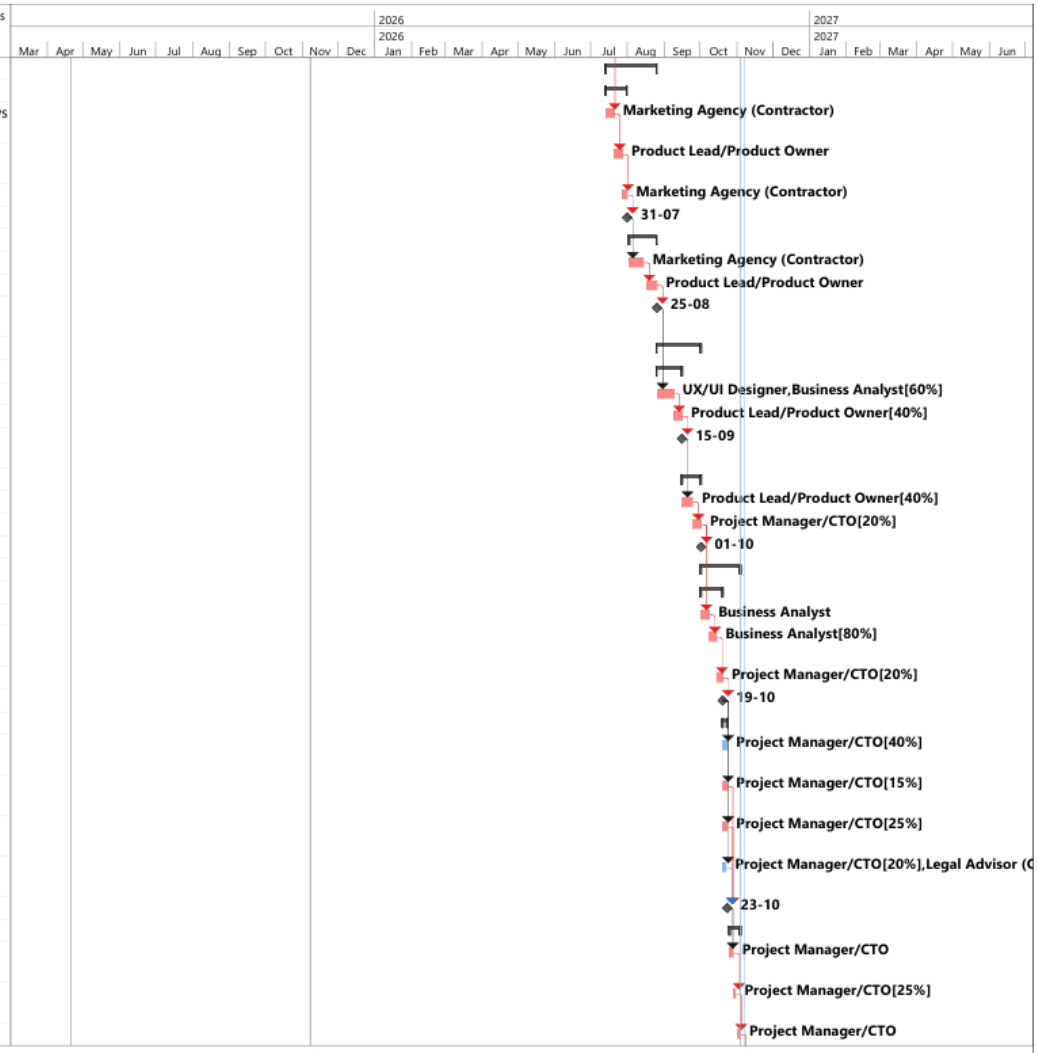
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
31		**5 Marketing and Launch**	**31 days**	**14-07-26**	**25-08-26**	
32		**5.1 Launch Campaign**	**14 days**	**14-07-26**	**31-07-26**	
33		5.1.1 Align campaign objectives and KPIs	5 days	14-07-26	20-07-26	30FS-3 days
34		5.1.2 dentify target audience and personas	5 days	21-07-26	27-07-26	33
35		5.1.3 Stakeholder Engageme	4 days	28-07-26	31-07-26	34
36		5.1.4 Marketing Budget App	0 days	31-07-26	31-07-26	35
37		**5.2 Create promotional mater**	**17 days**	**03-08-26**	**25-08-26**	
38		5.2.1 Design visual assets	10 days	03-08-26	14-08-26	36
39		5.2.2 Define copy for materi	7 days	17-08-26	25-08-26	38
40		5.2.3 Final approval of promotional materials	0 days	25-08-26	25-08-26	39
41		**6 Documentation and training**	**27 days**	**26-08-26**	**01-10-26**	
42		**6.1 User documentation**	**15 days**	**26-08-26**	**15-09-26**	
43		6.1.1 Create manual for the	10 days	26-08-26	08-09-26	40
44		6.1.2 List frequen asked que	5 days	09-09-26	15-09-26	43
45		6.1.3 Final User Documentation Release	0 days	15-09-26	15-09-26	44
46		**6.2 Training**	**12 days**	**16-09-26**	**01-10-26**	
47		6.2.1 User manual	7 days	16-09-26	24-09-26	45
48		6.2.2 Knowledge transfer (K	5 days	25-09-26	01-10-26	47
49		6.2.3 Documentation & KT S	0 days	01-10-26	01-10-26	48
50		**7 Project Closing**	**23 days**	**02-10-26**	**03-11-26**	
51		**7.1 Final review**	**12 days**	**02-10-26**	**19-10-26**	
52		7.1.1 Prepare final project r	5 days	02-10-26	08-10-26	48
53		7.1.2 Create KPI (Key Performance Indicators)	4 days	09-10-26	14-10-26	52
54		7.1.3 Conduct lessons learne	3 days	15-10-26	19-10-26	53
55		7.1.4 Final Project Report	0 days	19-10-26	19-10-26	54
56		**7.2 Finalize administrative clo**	**4 days**	**20-10-26**	**23-10-26**	
57		7.2.1 Archive all project documentation	4 days	20-10-26	23-10-26	55
58		7.2.2 Review and close vendor contracts	4 days	20-10-26	23-10-26	55
59		7.2.3 Finalize Financial Accounts and Payments	4 days	20-10-26	23-10-26	55
60		7.2.4 Finalize contract closure documents	3 days	20-10-26	22-10-26	55
61		7.2.5 Administrative Closure	0 days	23-10-26	23-10-26	58,59,60
62		**7.3 Formal Project Acceptance**	**7 days**	**26-10-26**	**03-11-26**	
63		7.3.1 Submit final project report to stakeholders	3 days	26-10-26	28-10-26	61
64		7.3.2 Obtain formal sign-off from project sponsor	2 days	29-10-26	30-10-26	63
65		7.3.3 Closure	2 days	02-11-26	03-11-26	64



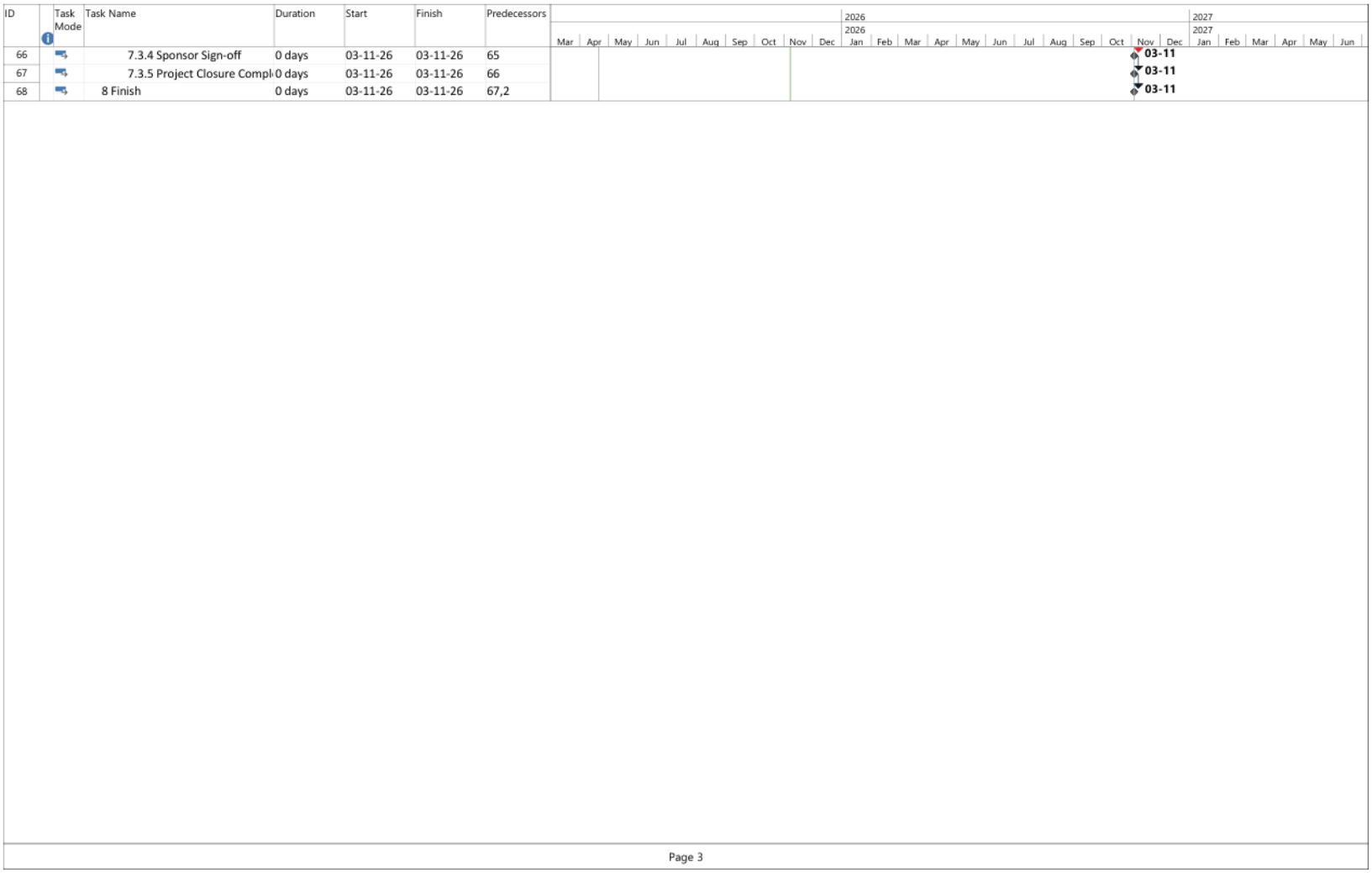


Figure 3. Gantt diagram

Milestone Plan

Below is a comprehensive milestone plan for the AI-based Nutrition Augmented Reality App for Supermarket Chains project. It integrates predictive planning milestones each with a unique identifier, description, project phase, estimated date, and associated deliverables/validation criteria.

Table 8: Milestone Plan

ID	Milestone Name	Project Phase	Estimated Date	Responsible Approver	Acceptance Criteria / Key Deliverables
M1	Project Charter Approved	Initiation	21-March-2025	Project Sponsor	Signed Charter authorizing scope, budget and schedule.
M2	Project Management Plan Baseline	Planning	28-March-2025	Project manager / Project Sponsor	Integrated plan (scope, schedule, cost, risk, comms) approved and baselined.
M3	Team Formation Complete	Executing	04-Apr-2025	Project Manager	All key roles assigned; RACI updated and communicated.
M4	Performance Evaluation Complete	Monitoring and controlling	During execution of the project	Project manager / Project Sponsor	All progress evaluation reports delivered and approved; stakeholder feedback sessions completed; corrective actions documented.
M5	Sign the handover document	Closing	3-Nov-2026	Project manager	Signed handover document
M6	Software Requirements Sign-off	Product Discovery and Requirements	27-May-2025	Product Owner and project Sponsor	Final Software requirements document approved; competitive analysis attached; traceability matrix complete.
M5	Data Consolidation and Preparation Complete	AI Model Foundation	14-Jul-2025	Data Science team	Cleaned dataset validated; Quality Assurance checklist passed; data issues <2%.

ID	Milestone Name	Project Phase	Estimated Date	Responsible Approver	Acceptance Criteria / Key Deliverables
M6	Dataset Split and Ready for Training	AI Model Foundation	31-Jul-2025	Data Science team	Training/validation/test sets documented and approved; reproducibility verified.
M7	Model Testing Complete	AI Model Foundation	28-Aug-2025	Data Science team	Accuracy ≥ 90 %, Precision ≥ 88 % on validation set; confusion matrix reviewed.
M8	Model Exported for Mobile Integration	AI Model Foundation	04-Sep-2025	Development lead	Model packaged (TensorFlow Lite) and passes security scan.
M9	Marketing Budget Approved	Marketing and Launch	31-Jul-2026	Marketing Manager / Project Sponsor	KPIs defined, personas validated, funding release approved.
M10	Final approval of promotional materials	Marketing and Launch	25-Aug-2026	Marketing Manager	Visual assets and copy signed off; brand compliance check passed.
M11	Documentation and Knowledge Transfer Sign-off	Documentation and Training	01-Oct-2026	Project Manager and project Sponsor	Training sessions delivered; attendance logs and feedback approved.
M12	Final project report	Project Closing – Final Review	19-Oct-2026	Project manager	Lessons Learned report accepted; repository updated.
M13	Administrative Closure Complete	Project Closing – Admin Closure	23-Oct-2026	Finance team / Project manager	All vendor contracts closed; financial reconciliation and document archiving complete.
M14	Sponsor Sign-off	Project Closing –	03-Nov-2026	Project Sponsor	Formal acceptance of final project report and all deliverables.

ID	Milestone Name	Project Phase	Estimated Date	Responsible Approver	Acceptance Criteria / Key Deliverables
		Formal Acceptance			
M15	Project Closure Complete	Project Closing	03-Nov-2026	Project Manager	All objectives met; closure checklist signed; team released.

For the agile methodology

Product Owner: Development Lead / Product Manager

Product Vision: Deliver a cross-platform mobile application (iOS and Android) that uses **AI** for food recognition and **AR** overlays to provide real-time nutritional and sustainability insights to supermarket customers.

Duration: 7.5 months (15 × 3 week sprints)

Team Size: 10 specialists: Project lead as product owner, project manager/CTO as Scrum master, development Lead, mobile developers, backend developer, an AI/ML specialist, AR developer, UX/UI designer, QA engineer, business analyst.

Success Criteria:

- Minimum Viable Product (MVP) released to pilot stores with:
    - AI model integrated and scanning foods with ≥90 % recognition accuracy.
    - AR overlay displaying nutritional and sustainability data in <1 second.
    - Secure login, data privacy compliance, and backend APIs fully functional.
- App Store/Play Store pilot rating ≥4.0 after first month.
- Core performance KPIs (latency, crash-free sessions) within defined thresholds.

Dependencies:

- Completion of product discovery and requirements which corresponds to Milestones M6, where people are defined, the user interview is conducted, and the software requirement is delivered.
- Completion of Model Exported for Mobile Integration (M8) milestone from predictive phase.

User Story Map

1. Discover Products: as a supermarket shopper, I want to scan items so I can see nutrition & sustainability.
2. View Nutrition & Sustainability Info: as a health-conscious user, I want validated info so I can make better decisions.

3. Get Personalized Suggestions: as a user, I want recommendations for healthier or sustainable alternatives.
4. Track Purchases: as a shopper, I want to see a summary of my food purchases for self-monitoring.

Iterative planning

The Product Backlog is organized into epics that represent the major work blocks. Each sprint delivers a shippable increment; backlog is refined continuously.

Table 9: Iterative Plan

Epic / Priority Work Block	Epic Description	Target Sprint Window	Key Deliverables
E1 – Technical Architecture and Infrastructure	Establish CI/CD pipelines, secure cloud backend, and foundational APIs to support frequent deployments and scalable architecture.	Sprints 1-3	CI/CD pipeline, cloud environment, API skeleton, automated tests
E2 – AI Model Development and Integration	Develop and integrate the AI model to enable real-time recognition of foods and provision of nutrition data through the app.	Sprints 2-6	Integrated TensorFlow Lite model, API endpoints, real-time inference
E3 – Backend Development	Build scalable backend services and databases capable of handling millions of requests while ensuring reliability and security.	Sprints 2-8	Business logic, REST APIs, authentication services
E4 – Mobile Application Development	Create the iOS/Android application enabling AR-based scanning of produce and barcodes to display nutrition information.	Sprints 3-11	iOS/Android front-end, ARKit/ARCore setup, secure login
E5 – Quality and Technical Excellence	Ensure continuous quality through automated testing, security scans, and	Sprints 1-15 (continuous)	Automated test suites, security scans, performance monitoring

	performance monitoring to maintain stable releases.		
E6 – Continuous Delivery and Deployment Prep	Prepare and deliver beta builds to pilot stores with release notes and telemetry to monitor early usage.	Sprints 7-13	Beta builds, release notes, telemetry dashboards
E7 – Integration and Final Hardening	Final integration and stabilization to produce a fully functional MVP ready for pilot launch.	Sprints 12-15	MVP pilot release, load/performance tests, app-store submission package

Definition of Done

The minimum viable product (MVP) is considered complete when the AI model is fully trained, tested and exported for mobile integration, achieving a minimum accuracy of 85%. The mobile application must include integration with trained model and essential application functions such as user-secure login, product-camera scanning, and real-time visualization of nutritional and sustainability information should be present. Backend APIs must be integrated with secured authentication and data validations. The MVP should be able to be installed on both the App Store and Google Play as a beta version, for test users to be able to access it.

The full release will be considered complete when the application not only meets MVP criteria but also achieves scalability, performance, and user satisfaction goals. The AI model should be optimized for speed and resource efficiency on mobile devices, maintaining accuracy above 90%. The mobile application must support a polished, responsive, and accessible user interface with cross-platform compatibility. Backend services should handle high transaction volumes securely, with logging, monitoring, and error recovery in place. The application must pass comprehensive system integration, usability, and security testing, including penetration testing for data privacy compliance. A marketing campaign must be executed with approved promotional materials, and training resources, FAQs, and knowledge transfer sessions must be completed for both end-users and internal support teams. Finally, formal sign-off from project sponsors and stakeholders must be obtained, with user adoption metrics >70% satisfaction, >80% successful scans confirming readiness for wide-scale launch.

Project Work Plan and Timeline

The project schedule for the AI-based Nutrition Augmented Reality App for Supermarket Chains has been developed using a hybrid scheduling approach. This means that it combines predictive methods for the initial and closing phases with adaptive (agile) methods during the core development cycle.

The project will take 402 calendar days, 18.5 months. It will start on April 21, 2025, and end on November 3, 2026. The Gantt chart makes it easy to see all the activities and their corresponding

dates, the duration of each activity, the sequence of activities, and the milestones. The project has six phases. Product Discovery and Requirements, AI Model Foundation (CPMAI), Development (Agile), Marketing & Launch, Documentation & Training, and Project Closing.

During the Product Discovery and Requirements phase, user interviews, market research, and competitive analysis are conducted to ensure the project has a solid background and clear specifications. Next is the AI Model Foundation phase, which is based on the CPMAI framework and has a very clear, sequential structure. This phase includes data collection, cleaning, analysis, and model training. Finally, the AI model is exported for mobile integration. Both phases are based on a predictive methodology, which enables tasks to be executed in an organized and controlled manner, ensuring technical stability and ensuring that activities are carried out as planned.

After the initial phases are complete, product development begins using an agile methodology, allowing system functionalities to be implemented iteratively and incrementally. This phase is divided into sprints, during which user story mapping decomposes epics into smaller user stories and links them with sprint planning. Fifteen sprints are planned to allow for continuous deliveries, prompt feedback, and timely adjustments according to user needs. In this way, incremental value delivery and early Minimum Viable Product (MVP) validation are guaranteed. Progress will be monitored using burn-down and burn-up charts, which indicate delivery at the sprint level and total progress. Scrum ceremonies, including sprint planning, daily stand-ups, reviews, and retrospectives, will be conducted with the help of Jira boards and Agile dashboards to ensure transparency and communication among teams.

Uncertainty in the Agile phase will be managed through iterative delivery, reprioritization of the backlog, and periodic reviews with stakeholders. Team performance will be analyzed using velocity trends and cumulative flow diagrams to guide capacity adjustments and forecasting.

The marketing and launch phase begin a little before the end of development. It defines campaign objectives, key performance indicators (KPIs), and promotional materials. This ensures a smooth transition between development and launch. The Documentation and Training phase, which follows, delivers all product related materials, including manuals, guides, and knowledge transfer sessions, to ensure effective system adoption. The final Project Closing phase includes the final report, documentation of lessons learned, formal approval from the sponsor, and administrative and financial closure. This guarantees complete traceability from initial planning to final delivery.

The Gantt chart provides a visual representation of activities, dependencies, and the critical path for all phases. It identifies the tasks that determine the overall project duration, along with their predecessors, durations, and key milestones. During the predictive phases, schedule management will be conducted through baseline scheduling, milestone tracking, and earned value analysis. In addition, formal gate reviews will ensure that each stage is completed before advancing. The risk management plan will address uncertainties, and dependencies are explicitly identified in the Gantt chart.

Combining predictive and agile methodologies allows the project to be organized in a structured but flexible sequence. The early and closing predictive phases (requirements gathering, dataset preparation, integration, and documentation) benefit from rigorous planning and milestone tracking. In the agile development phase, adaptability and continuous validation are required.

Overall, this schedule reflects a coherent and realistic hybrid approach aligned with PMBOK 7 standards and the best agile practices. This approach ensures a balance between control, flexibility, and value delivery throughout the project lifecycle.

Schedule Monitoring and Control

Changes to the schedule will be made using the right tools for the chosen method.

For Predictive activities with any proposed schedule modification will follow the Integrated Change Control process. This process requires thorough documentation and an assessment of the impact on scope, cost, and schedule. It also requires formal approval, once approved, the updates will be incorporated into the revised project baseline and formally communicated to all relevant stakeholders.

For Agile activities require adjustments will be managed during sprint planning sessions. The Product Owner and the Scrum Team will collaborate on backlog reprioritization, story re-estimation, and resource reallocation.

4.4 Cost Management Planning

This Cost Management Plan presents the structured financial strategy for developing the AI-Based Nutrition Augmented Reality App for Supermarket Chains. It describes how costs are estimated, budgeted, allocated, and monitored throughout the project lifecycle. Considering the technological complexity and innovative nature of the project, a hybrid methodology was selected that combines predictive (Waterfall) and adaptive (Agile) approaches to maintain financial stability while allowing the flexibility required to manage uncertainty.

The Waterfall phases, which last approximately 20 weeks at the beginning and 15 weeks at the end, include activities such as research, design, data acquisition, marketing, and project closure. These stages ensure that the project's foundational elements and operational deliverables are well-structured and validated. The Agile phase is the longest and most resource-intensive, covering around 50 weeks of iterative development, model integration, testing, and user validation. This structure was chosen because, although the project scope is clearly defined, the integration of AI and the creation of a new application involve technological uncertainty and require ongoing adaptation based on stakeholder feedback.

The predictive phase provides a reliable cost baseline, while the Agile estimation incorporates a higher level of uncertainty due to its adaptable nature. Cost estimations were prepared as accurately as possible, including the Risk Cost Allocation, which represents the amount reserved for risks that the team has chosen to avoid, transfer or mitigate through specific actions. Additionally, a contingency reserve was included for risks with a moderate probability of occurrence. For these cases, 80 percent of the potential impact was considered to prepare the budget more conservatively. More details can be found in the Risk Management Plan.

It is also relevant to mention that Innovative Consulting Group does not include overhead or indirect costs in its budgeting. Instead, pricing is calculated based on a higher profitability margin, avoiding inflation of fixed and variable costs directly associated with the project

Budget Overview

Table 10: Budget Overview

Activity Costs	**$ 615,152.49**
Risk Cost Allocation	$ 121,000.00
Total Act. Est.	**$ 736,152.49**
Contingency R.	$ 48,000.00
Baseline	**$ 784,152.49**
Management R. (5%)	$ 39,207.62
Project Budget	**$ 823,360.11**

As reflected in the cost breakdown, the Activity Cost, which includes all resources, contracts, and materials (software in this case), amounts to USD 615,152.49. When adding the costs associated with risks that were fully mitigated or avoided, this figure increases by USD 121,000.00, resulting in a total estimated cost of USD 736,152.49. A contingency reserve of USD 48,000 is then included to cover approximately 80 percent of the remaining risks that have been accepted and may require mitigation if they occur. Finally, a management reserve is added based on company policy and the CEO's recommendation for projects that follow an Agile approach.

At the beginning of the project, the total estimated cost was USD 869,600. However, after completing the Schedule Management Plan and the Cost Management Plan, the revised Project Budget amounts to USD 823,360, which includes a 5 percent Management Reserve. Even with this adjustment, the budget retains a buffer of USD 46,240, which can be considered a financial advantage or a stability margin for the Agile development phase. This explains why the initial estimations in the Project Charter were intentionally higher. The company follows a conservative financial approach that seeks to ensure profitability while acknowledging the risks and uncontrollable factors associated with technological projects.

Detailed Costs

The cost structure was developed based on resource rates, estimated work effort, and material and contractual expenses. Table 11 summarizes the major cost categories per project phase, emphasizing the predominance of labor and software development costs.

Table 11: Detailed Cost

Task Name	Cost per phase	Percentages
Foundation Phase	$ 69,051.32	11.2%
Development (Agile)	$ 462,959.10	75.3%
Marketing and Launch	$ 65,800.00	10.7%
Documentation and training	$ 6,647.07	1.1%
Project Closing	$ 10,695.00	1.7%
Total	**$ 615,152.49**	**100%**

The table above presents the detailed cost distribution across all project phases. Expenditures are allocated to research, data collection, AI model development, application design, Agile software sprints, and marketing activities. The largest portion of the budget corresponds to the Agile development phase, representing more than 75% of total project costs.

For further details, the cost table is presented below:

Table 12: Cost Management plan

ID	ID	WBS	Task Name	Resp/Acc.	Resources	Duration	Units	Work	$/h	HR	Materials	Contracts	Cost
		0	**AI-based Nutrition Augmented Reality App for Supermarket Chains**							**$ 505 685,82**	**$ 4 466,67**	**$105 000,00**	**$ 615 152,49**
		1	**Project Management**	CEO	**Project Manager/CTO**								**$ -**
		2	**Foundation Phase**										**$ 69 051,32**
		2,1	**Product Discovery & Requirements**										**$ 32 837,64**
1	A	2.1.1	Conduct stakeholder interviews	Project Manager/CTO	Product Lead	5	1	40	$ 43,75	$ 1 750,00			$ 1 750,00
2	B	2.1.2	Prepare interview transcript	Product Lead	Business Analyst	2	0,5	8	$ 31,25	$ 250,00			$ 250,00
2	B	2.1.2	Prepare interview transcript	Product Lead	Data Analyst	2	0,5	8	$ 31,25	$ 250,00			$ 250,00
3	**C**	2.1.3	Conduct user research	Product Lead	UX/UI designer	7	0,5	28	$ 34,38	$ 962,64			$ 962,64
3	**C**	2.1.3	Conduct user research	Product Lead	Business Analyst	7	0,5	28	$ 31,25	$ 875,00			$ 875,00
4	**D**	2.1.4	Analyze user research findings	Product Lead	Product Lead	4	1	32	$ 43,75	$ 1 400,00	$ 250,00		$ 1 650,00
5	**E**	2.1.5	Conduct competitive bechmarking	Product Lead	Marketing Agency (Contractor)	5		0		$ -		$ 20 000,00	$ 20 000,00
6	**F**	2.1.6	Define the specifications of the product	Project Manager/CTO	Legal Advisor	5						$ 5 000,00	$ 5 000,00
6	**F**	2.1.6	Define the specifications of the product	Project Manager/CTO	Product Lead	6	1	48	$ 43,75	$ 2 100,00			$ 2 100,00
		2,2	**AI Model Foundation (CPMAI)**										**$ 36 213,68**
7	**G**	2.2.1	Identification of available dataset	Project Manager/CTO	AI/ML Specialist	3	1	24	$ 40,63	$ 975,12	$ 400,00		$ 1 375,12
7	**G**	2.2.1	Identification of available dataset	Product Lead	Business Analyst	3	1	24	$ 31,25	$ 750,00			$ 750,00
8	**H**	2.2.2	Collect and consolidate relevant food-related data	Project Manager/CTO	AI/ML Specialist	7	1	56	$ 40,63	$ 2 275,28	$ 700,00		$ 2 975,28
8	**H**	2.2.2	Collect and consolidate relevant food-related data	Product Lead	Nutritionist (Contractor)	7	1	56		$ -		$ 7 500,00	$ 7 500,00
9	**I**	2.2.3	Annotate and label food items	Product Lead	Nutritionist (Contractor)	10	1	80		$ -		$ 7 500,00	$ 7 500,00

ID	ID	WBS	Task Name	Resp/Acc.	Resources	Duration	Units	Work	$/h	HR	Materials	Contracts	Cost
10	**J**	2.2.4	Exploratory Data Analysis (EDA)	Project Manager/CTO	Data Analyst	7	1	56	$ 31,25	$ 1 750,00			$ 1 750,00
11	**K**	2.2.5	Data cleaning: outliers, NA, duplicates, inconsistencies	Project Manager/CTO	Data Analyst	7	1	56	$ 31,25	$ 1 750,00	$ 716,67		$ 2 466,67
12	**L**	2.2.6	Data transformation: type conversion, scaling and normalization, etc.	Project Manager/CTO	Data Analyst	5	1	40	$ 31,25	$ 1 250,00	$ 533,33		$ 1 783,33
13	**M**	2.2.7	Principal Component Analysis for dimensionality reduction	Project Manager/CTO	AI/ML Specialist	5	1	40	$ 40,63	$ 1 625,20	$ 500,00		$ 2 125,20
14	**N**	2.2.8	Split dataset (training, validation, testing)	Project Manager/CTO	AI/ML Specialist	3	1	24	$ 40,63	$ 975,12			$ 975,12
15	**O**	2.2.9	Measure accuracy and precision	Project Manager/CTO	AI/ML Specialist	10	1	80	$ 40,63	$ 3 250,40			$ 3 250,40
16	**P**	2.2.10	Generate confusion matrix	Project Manager/CTO	AI/ML Specialist	3	0,5	12	$ 40,63	$ 487,56			$ 487,56
17	**Q**	2.2.11	Conduct testing	Project Manager/CTO	QA Engineer	7	0,5	28	$ 31,25	$ 875,00	$ 600,00		$ 1 475,00
18	**R**	2.2.12	Export the model to integrate with mobile development (TensorFlow Lite)	Project Manager/CTO	Mobile Developer	5	1	40	$ 37,50	$ 1 500,00	$ 300,00		$ 1 800,00
19	**S**	**3**	**Development (Adaptative Methodology Agile)**	Project Manager/CTO	**Development Team**								**$ 462 959,10**
			15 Sprints		Product Lead as Product Owner	225	0,9	1620	$ 43,75	$ 70 875,00			$ 70 875,00
			15 Sprints		Project Manager/CTO (as Scrum Master if needed)	225	0,8	1440	$ 56,25	$ 81 000,00			$ 81 000,00
			15 Sprints		Backend Developer	225	0,85	1530	$ 40,63	$ 62 163,90			$ 62 163,90
			15 Sprints		Development Lead	225	0,25	450	$ 46,88	$ 21 096,00			$ 21 096,00
			15 Sprints		Mobile Developer	225	0,8	1440	$ 37,50	$ 54 000,00			$ 54 000,00
			15 Sprints		QA Engineer	225	0,9	1620	$ 31,25	$ 50 625,00			$ 50 625,00
			15 Sprints		UX/UI Designer	225	0,8	1440	$ 34,38	$ 49 507,20			$ 49 507,20
			15 Sprints		AI/ML Specialist	225	0,5	900	$ 40,63	$ 36 567,00			$ 36 567,00
			15 Sprints		Business Analyst	225	0,33	594	$ 31,25	$ 18 562,50			$ 18 562,50
			15 Sprints		Data Analyst	225	0,33	594	$ 31,25	$ 18 562,50			$ 18 562,50
		4	**Marketing and Launch**										**$ 65 800,00**
		4,1	**Launch Campaign**										$ 43 350,00

ID	ID	WBS	Task Name	Resp/Acc.	Resources	Duration	Units	Work	$/h	HR	Materials	Contracts	Cost
20	T	4.1.1	Align campaign objectives and KPIs	Product Lead	Marketing Agency (Contractor)	5		0		$ -		$ 20 000,00	$ 20 000,00
20	T	4.1.1	Align campaign objectives and KPIs	Project Manager/CTO	Product Lead	5	1	40	$ 43,75	$ 1 750,00			$ 1 750,00
21	U	4.1.2	Identify target audience and personas	Product Lead	Marketing Agency (Contractor)	5		0		$ -		$ 20 000,00	$ 20 000,00
22	V	4.1.3	Stakeholder Engagement Review	Project Manager/CTO	Product Lead	4	1	32	$ 43,75	$ 1 400,00	$ 200,00		$ 1 600,00
		4,2	**Create promotional material**										$ 22 450,00
23	W	4.2.1	Design visual assets	Product Lead	Marketing Agency (Contractor)	10		0		$ -		$ 20 000,00	$ 20 000,00
24	X	4.2.2	Define copy for materials	Project Manager/CTO	Product Lead	7	1	56	$ 43,75	$ 2 450,00			$ 2 450,00
		5	**Documentation and training**										**$ 6 647,07**
		5,1	**User documentation**										$ 5 217,07
25	Y	5.1.1	Create manual for the users	Product Lead	UX/UI Designer	10	1	80	$ 34,38	$ 2 750,40	$ 266,67		$ 3 017,07
25	Y	5.1.2	Create manual for the users	Product Lead	Business Analyst	10	0,6	48	$ 31,25	$ 1 500,00			$ 1 500,00
26	Z	5.1.3	List frequent asked question	Project Manager/CTO	Product Lead	5	0,4	16	$ 43,75	$ 700,00			$ 700,00
		5,2	**Training**										$ 1 430,00
27	AA	5.2.1	User manual	Project Manager/CTO	Product Lead	7	0,4	22,4	$ 43,75	$ 980,00			$ 980,00
28	AB	5.2.2	Knowledge transfer (KT) sessions		Project Manager/CTO	5	0,2	8	$ 56,25	$ 450,00			$ 450,00
		6	**Project Closing**										**$ 10 695,00**
		6,1	**Final review**										$ 2 320,00
29	AC	6.1.1	Prepare final project report	Product Lead	Business Analyst	5	1	40	$ 31,25	$ 1 250,00			$ 1 250,00
30	AD	6.1.2	Create KPI (Key Performance Indicators) report	Product Lead	Business Analyst	4	0,8	25,6	$ 31,25	$ 800,00			$ 800,00
31	AE	6.1.3	Conduct lessons learned session		Project Manager/CTO	3	0,2	4,8	$ 56,25	$ 270,00			$ 270,00
		6,2	**Finalize administrative closure**										$ 6 710,00
32	AF	6.2.1	Archive all project documentation	CEO	Project Manager/CTO	4	0,4	12,8	$ 56,25	$ 720,00			$ 720,00

ID	ID	WBS	Task Name	Resp/Acc.	Resources	Duration	Units	Work	$/h	HR	Materials	Contracts	Cost
33	AG	6.2.2	Review and close vendor contracts	CEO	Project Manager/CTO	4	0,15	4,8	$ 56,25	$ 270,00			$ 270,00
34	AH	6.2.3	Finalize Financial Accounts and Payments	CEO	Project Manager/CTO	4	0,25	8	$ 56,25	$ 450,00			$ 450,00
35	AI	6.2.4	Finalize contract closure documents	CEO	Legal Advisor	3						$ 5 000,00	$ 5 000,00
35	AI	6.2.4	Finalize contract closure documents	CEO	Project Manager/CTO	3	0,2	4,8	$ 56,25	$ 270,00			$ 270,00
		6,3	**Formal Project Acceptance**										$ 1 665,00
36	AJ	6.3.1	Submit final project report to stakeholders	CEO	Project Manager/CTO	3	1	24	$ 56,25	$ 1 350,00			$ 1 350,00
37	AK	6.3.2	Obtain formal sign-off from project sponsor	CEO	Project Manager/CTO	2	0,25	4	$ 56,25	$ 225,00			$ 225,00
38	AL	6.3.3	Closure	CEO	Project Manager/CTO	2	0,1	1,6	$ 56,25	$ 90,00			$ 90,00

It is important to note that no equipment costs are included in the budget, as the consulting firm will provide all computers and devices. Any specialized hardware or systems containing proprietary information will be supplied directly by the client. In terms of materials, the only necessary purchases involve software licenses and cloud services, which will be further detailed in the Procurement Management Plan.

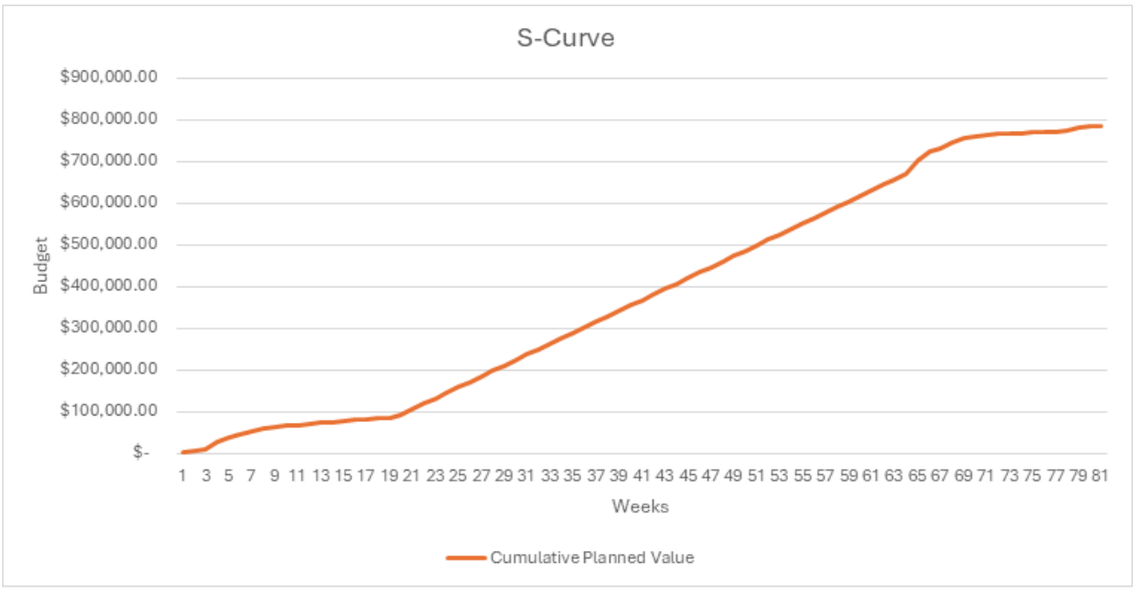


Figure 4. CPV (Cumulative Planned Value)

As illustrated by the S-Curve, cumulative project spending increases gradually during the initial Waterfall phases and accelerates significantly throughout the Agile development cycle (Weeks 20–70). This trend reflects the typical cost behavior of technology-driven projects, where resource utilization and operational intensity reach their peak during the core development stage, the most complex and resource-demanding part of the project. The curve maintains a relatively steady slope; however, actual variations are expected as resource allocation may fluctuate across sprints. For this reason, time and cost estimations were carefully calculated based on projected resource utilization across the entire Agile phase to establish a realistic and well-supported budget.

It is important to note that the S-curve reflects the project's Baseline Cost, which includes all costs except the management reserve. To achieve this, the risk-related costs were proportionally distributed across all activities. For this reason, the total value shown in the S-curve at week 81 reaches USD 891,744.

Timing of costs and financing plan

The project's financing structure is based on a four-payment scheme defined by the client. Payments will be made in Week 1, Week 25, Week 50, and Week 81, coinciding with key milestones and the project closure. While this approach simplifies administrative coordination and ensures payment alignment with progress checkpoints, it also introduces potential cash flow risks that is analyzed in the Risk Management Plan.

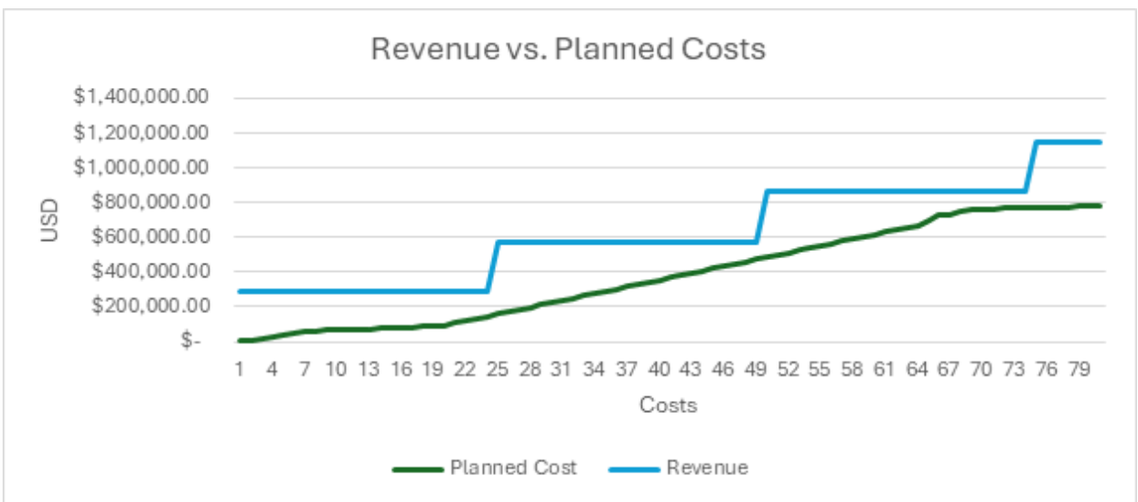


Figure 5. Revenue & Planned Costs

Because the project's expenditure pattern is not linear, with most costs concentrated between Weeks 20 and 70 during the Agile development phase, the gap between payments may create

temporary imbalances in liquidity. Since the total funding of USD 1,150,000 will be received in four equal installments at project initiation, at Week 25, at Week 50, and at project completion, it becomes essential to control costs carefully throughout the execution period. This situation requires precise cost estimation, strict monitoring of budget consumption, and efficient allocation of resources to prevent funding shortages during the most critical development stages. However, as shown in the chart, as long as we stay within the estimated costs, the project will remain financially stable and can be funded throughout its execution without any issues.

To mitigate these risks, the project management team will maintain continuous financial tracking through periodic reviews and earned value analysis. Establishing clear communication with the client regarding expenditure projections and milestone completion will be essential to maintaining financial stability throughout the project lifecycle.

Cost control and monitoring

The project's cost control strategy integrates Earned Value Management (EVM) with Agile-based value tracking. Traditional EVM indicators: Planned Value (PV), Earned Value (EV), and Actual Cost (AC). These estimations will be combined with sprint-based assessments to monitor financial performance. Key metrics include the Cost Performance Index (CPI) and Schedule Performance Index (SPI). Regular analysis enables proactive budget correction and continuous forecast updates (EAC, ETC).

4.5 Quality Management Planning

Purpose

The Quality Management Plan defines the quality objectives, standards, processes, and responsibilities that ensure the project delivers outputs that meet stakeholder expectations and comply with regulatory and contractual requirements. It aligns with PMI's PMBOK Guide principles and integrates FoodMart's strategic focus on conscious nutrition, sustainability, and user experience.

Quality Objectives

Quality objectives will be specific, measurable, achievable, relevant and time bound.

- Deliver an MVP that achieves 90% accuracy in product identification and barcode matching and guarantees AI model accuracy higher or equal than 85% in nutrition recognition during pilot testing.
  Correct identification is a key value proposition, whereas misidentification disrupts trust and may lead to regulatory exposure.

- Achieve an average system usability scale score higher or equal to 80 in pilot user testing and reach more than 30% adoption among pilot store customers within first 8 weeks of pilot.

- Ensure compliance with GDPR/CCPA and U.S. food labeling regulations.
  Fully comply with GDPR/CCPA and applicable United States privacy laws, zero critical data breaches, complete penetration test and remediation before pilot launch. Legal compliance and user trust are non-negotiable.

- Ensure that the app responds to scanning requests in less than 2 seconds, supports 50,000 simultaneous users and maintains higher or equal 99.5% uptime during business hours by MPV launch. Performance affects user experience, adoption and retention.

- Ensure that all nutritional information meets USDA/national labeling standards and local regulatory requirements and that all nutrition claims in the app are 100% verified by the Nutrition Lead or validated against an authoritative database.
  Incorrect nutritional claims can cause legal and reputational harm.

- App meets at least WCAG 2.1 AA accessibility standards for core flows and supports for MVP.
  Accessibility expands reach and meets inclusivity objectives. On the other hand, multilingual support improves adoption in diverse stores.

- Achieve an App Store rating of at least 4.2 over 5 and 85% positive user feedback. This will prove that users rate the APP in a positive way.

Quality Standards

To manage quality throughout the project the following quality standards will be applied:

- PMBOK® Guide: processes, best practices, terminologies, and guidelines.
- ISO/IEC 25010: Software Quality Model (reliability, usability, performance, security).
- ISO 9001: Quality management system principles.
- IEEE 829: Standard for software test documentation.
- GDPR/CCPA: Data privacy and security compliance.
- USDA/Nutrition Labeling Standards: Regulatory compliance.
- WCAG 2.1 AA (Web Content Accessibility Guidelines 2.1 Level AA): internationally recognized standards for making digital content accessible to people with disabilities.

Quality Assurance Approach

The purpose of the Quality Assurance (QA) Approach is to guarantee that every deliverable of the AI-based Nutrition Augmented Reality App meets the functional, technical, regulatory, and user-experience standards defined in the project charter and resource management plan.

Additionally, Quality Assurance ensures that processes are followed consistently across agile sprints and that all outputs align with FoodMart's strategic pillars: nutrition transparency, sustainability, and innovation.

Quality Assurance activities will be proactive, ensuring processes and deliverables align with agreed standards. The following activities will be carried out during the course of the project as best practices:

- Process Reviews: Periodic audits of coding practices, data governance, and architecture design. Regular quality audits will be conducted with the aim of verifying that the project processes align with the quality standards described.

  Additionally, peer reviews will be implemented for software code based on organizational coding standards. Moreover, quality circles will be established where team members can discuss regularly process improvements.

  Finally, specific internal audits will be conducted at the end of each major sprint to verify adherence to coding, documentation and testing standards.

- Checklists: Used during requirements gathering, design validation, and sprint planning. Detailed checklists derived from industry best practices will be created for key deliverables.

- Vendor Compliance: Review of third-party providers for SDKs, AI models, and databases.

- Training: Specialized quality training will be provided to team members for critical project activities such as, for example, on OWASP security, nutrition regulations, and UX design best practices.

Additionally, specific activities will be carried out during each phase of the project. These are described in the following table:

Table 13: QA activities

Project Phase	QA Activities	Outputs / Deliverables
Initiation & Planning	Establish QA strategy; define standards (ISO 25010, ISO 9001); review project scope and critical success factors; identify quality metrics.	Quality Management Plan baseline; Quality Checklists.

Requirements & Design	Validate requirements with stakeholders; verify alignment with FoodMart sustainability goals; perform architecture and data-security design review.	Approved requirements; Design Review Report; Updated RTM.
Development (Sprints)	Conduct peer code reviews; apply coding and AI modeling standards, run unit & integration tests; ensure data validation and GDPR compliance.	Verified code modules; Model Validation Logs; CI/CD reports.
Testing & Pilot	Execute functional, usability, and performance tests; ensure AR and AI integration meets response targets (<2 s); conduct nutrition data audits.	Test Summary Reports; Pilot Evaluation Checklist.
Deployment & Maintenance	Verify release readiness; perform regression testing and monitoring setup; collect post-release feedback and KPIs for improvement.	Release Sign-off Document; Post-Implementation Review.

Quality Control Approach

Quality Control activities will be reactive, validating deliverables against specifications. Below are described the different types o testing that will be carried out as part of the Quality Control.

- Functional Testing: Verification of product identification, barcode scanning, AR overlays.
- Performance Testing: Ensure <2 seconds scanning response and scaling to 50,000 concurrent users.
- Usability Testing: Collect user feedback during pilot launch and testing phases.
- Security Testing: Penetration testing and data privacy compliance checks.

Roles and Responsibilities

Specific responsibilities will be assigned to each role in order to guarantee Quality Assurance.

Table 14: QA Roles & Responsibilities

Role	Responsibilities
Project Manager	Ensures Quality Assurance plan execution, integrates QA activities into sprint schedule, escalates deviations, oversees implementation of QMP and ensures quality metrics are tracked.
QA Lead	Defines QA standards and checklists, coordinates test cycles, consolidates QA reports, manages defect lifecycle and ensures compliance with standards.
CTO / Development Lead	Ensures technical quality, system scalability, and architecture compliance. Reviews architecture and performance metrics, validates DevOps quality gates.
AI/ML Specialist	Validates model accuracy, monitors bias and data quality.
UX/UI Designer	Leads usability and accessibility validation aligned with FoodMart branding.
Product Lead	Confirms compliance with functional requirements and user experience goals. Validates usability, user feedback and feature prioritization.
Nutrition Expert & Legal Advisor	Validate nutritional and regulatory data accuracy and approve labeling compliance.
HR Lead	Ensures qualified personnel are trained in QA tools and agile quality practices.
All Team Members	Adhere to coding standards, testing protocols, and quality guidelines.

Quality Metrics

Table 15: Quality metrics

Metric	Target Value	Measurement Method
AI recognition accuracy	≥ 85%	Pilot testing data

Barcode scan accuracy	≥ 90%	Functional test results
App uptime	≥ 99.5%	Monitoring tools
Response time	< 2 seconds	Performance testing
Critical defect leakage	< 2%	Post-release defect tracking
User satisfaction	≥ 4.2/5 rating	App store reviews & surveys
Regulatory compliance	100% compliance	Legal audits & validation

Quality Tools

Quality tools and different systems will be used for collecting, organizing and analyzing data to identify problems, their root causes, and solutions. In an overall perspective, below are described the tools to be used for different approaches:

- Project Management Tools: Jira, MS Project for tracking defects and KPIs.
- Testing Frameworks: Automated test suites, OWASP security tools, unit/integration tests.
- Design Tools: Figma for UI/UX validation.
- Dashboards: Real-time metrics visualization for progress and quality indicators.

Among these tools, below there is a description of specific use cases:

- Jira: Sprint management, defect tracking and Quality Assurance dashboard
- GitLab CI/CD: Automated builds, unit testing and deployment validation.
- SonarQube: static code analysis and code-quality reporting.
- Postman & JMeter: API and load testing tools.
- Figma & Maze: Usability testing and prototype validation.
- OWASP ZAP/ Synk: Security vulnerability scanning.
- MS Teams / Confluence: Quality Assurance documentation, audit logs and communication.

Escalation and Reporting

In the event that any type of non-conformity is detected in any of the quality controls, in the various audits or in any time during the project, a defined process will be followed to address each case.

First, Quality Assurance deviations will be reported to the Project Manager and discussed in the Steering Committee meetings. Additionally, any critical risk or non-conformity such as performance degradation, data privacy issue or regulatory gap will be escalated immediately to the Sponsor.

All this information will be recorded so that there is a record and traceability of the non-conformities identified. This record will be reviewed periodically with the person responsible in order to establish the actions to be taken to eliminate or mitigate them.

The process to be followed is shown in the following figure.

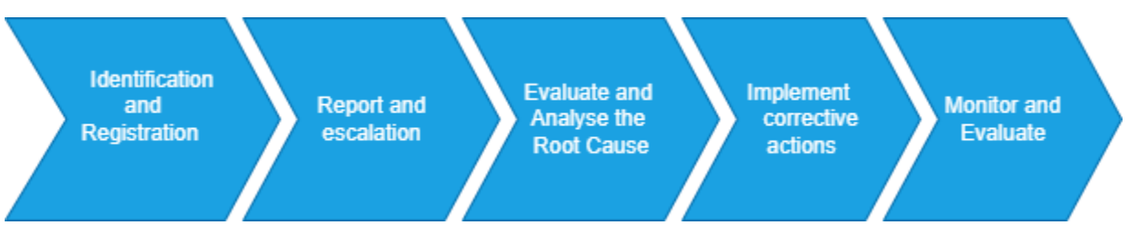


Figure 6. Escalation and Reporting Process

Continuous Improvement

Continuous improvement will be carried out to ensure sustained quality and responsiveness to real usage. The project will adopt an Agile continuous improvement cycle and will be aligned with FoodMart's innovation culture.

- Sprint retrospectives to identify and implement quality improvements.
- Regular feedback collection from pilot users.

- Kaizen approach to incremental enhancements in both technical and functional areas.
- Benchmarking against industry practices to maintain competitive quality levels.

This cycle will allow quality improvements in potential bugs, UX improvements or model retraining.

Acceptance Criteria

Deliverables will be accepted if:

- Functional and non-functional requirements are met.
- Quality metrics are within defined thresholds.
- Compliance with legal, regulatory, and contractual standards is demonstrated.
- The sponsor and key stakeholders formally sign off during the closure phase.

4.6 Resource Management Planning

Project Organization

The resource management strategy for the AI-Based Nutrition Augmented Reality App for Supermarket Chains follows a hybrid (predictive + agile) approach consistent with Activity Costs of $615,152.49 USD. The resources are structured according to their specialization to ensure both accountability and flexibility throughout the 81-week lifecycle.

Organizational Breakdown Structure (OBS)

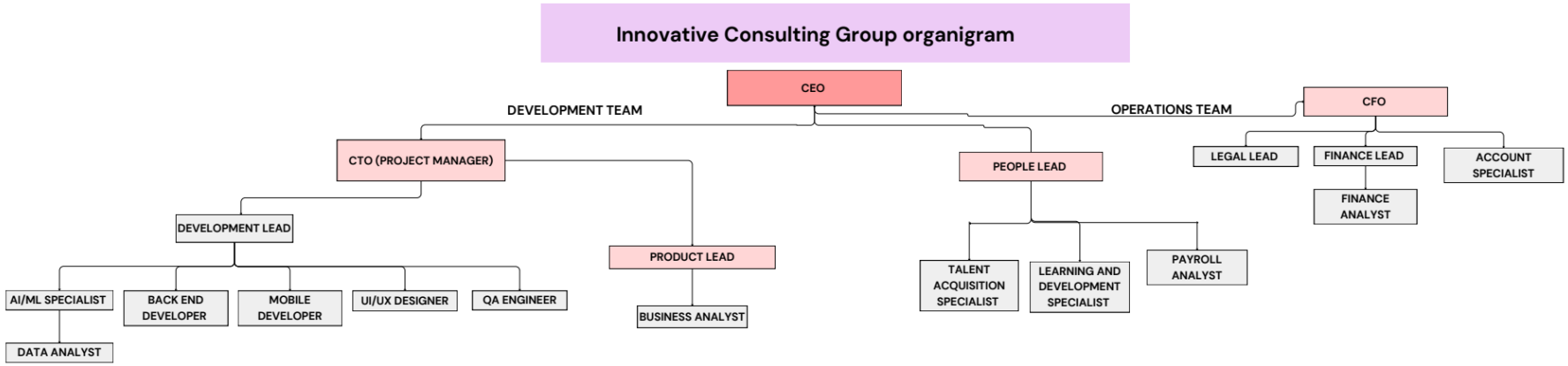


Figure 7. Organizational Breakdown Structure

The Innovative Consulting Group has a hierarchical structure with two-branch:

- Development Team:
  - Led by the CTO (Project Manager), including the Product Lead, Development Lead, and specialized engineers.
- Operations Team:
  - Lead by the CFO and People Lead, managing finance, HR, and legal support.

The C-level executives and leading departments report directly to the CEO.

Resource Breakdown Structure (RBS)

For this project, only the development team is considered, as they are responsible for executing all technical activities throughout the project lifecycle. The organizational structure is clearly defined: the CTO reports directly to the CEO; both the Product Lead and Development Lead report to the CTO; the Business Analyst reports to the Product Lead; and the entire technical and development team reports to the Development Lead. However, due to the project's complexity, the CTO also assumes the role of Project Manager, meaning that for specific high-priority or technically demanding tasks, certain resources may report directly to the CTO/Project Manager to ensure alignment and efficiency.

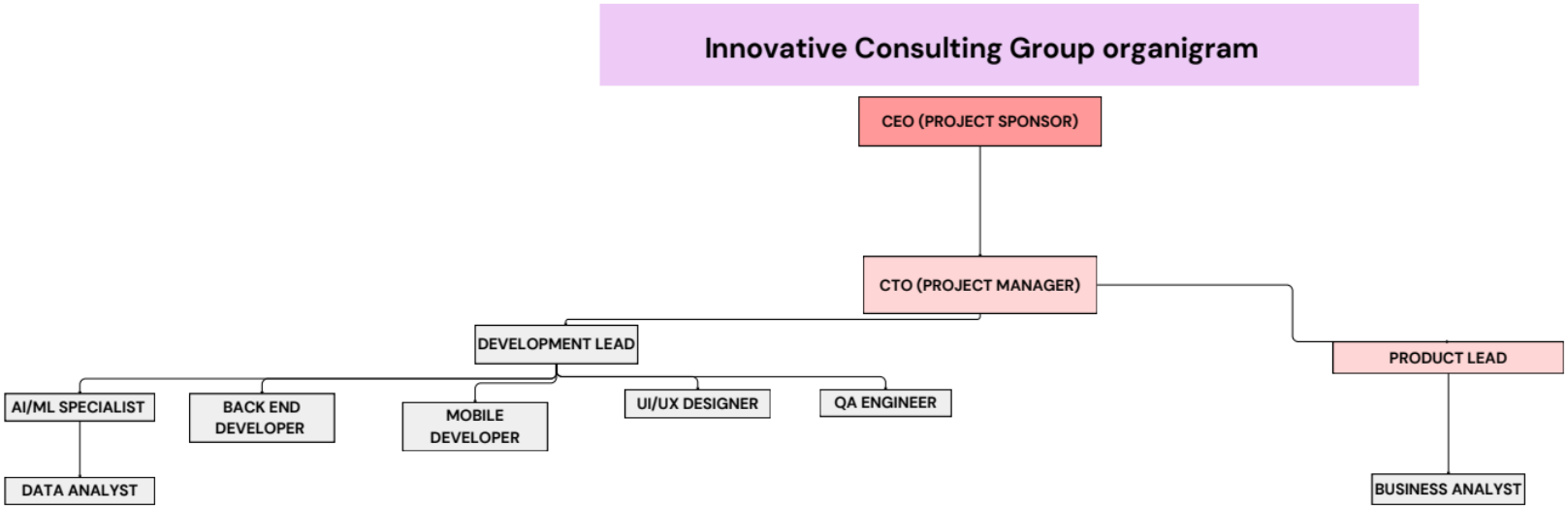


Figure 8. Resource Breakdown Structure (RBS)

Roles and Responsibilities

Table 16: Roles & Responsibilities

Role	Key Responsibilities
External: Client	Define the requirements and approve deliverables.
CEO (Project Sponsor)	The head of the company and the person in charge that all the requirements are met.
Project Manager / CTO	Responsible for defining the technology and strategy, overseeing product development, ensuring system architecture and security of the company and projects. Oversees schedule, scope, and cost, leads Agile ceremonies; ensures technical feasibility.
Product Lead / Owner	Defines and owns the product roadmap, prioritizes the backlog, and ensures that user experience and business value are consistently validated throughout the agile development process.
Development Lead	Coordinates technical tasks, supervises code quality and CI/CD integration.
AI/ML Specialist	Develops, trains, and validates the nutrition recognition model.
Backend Developer	Implements APIs and database structures.
Mobile Developer	Builds iOS and Android interfaces and integrates TensorFlow Lite models.
QA Engineer	Designs and executes functional, integration, and performance tests.
UX/UI Designer	Produces prototypes, maintains design consistency, and ensures accessibility.
Data Analyst	Cleans and preprocesses data; supports EDA and reporting.
Nutritionist (Contractor)	Validates datasets and ensures regulatory compliance.

Marketing Agency (Contractor)	Develops initial market research to understand user needs. Designs and executes promotional campaigns to generate awareness of the app
Legal Advisor (Contractor)	Specialist in data protection, patents, and technological development who will oversee all the legal issues related to the project. He will work collaboratively with our internal legal lead.
Operations Team: CFO, People Lead, Legal Lead, Finance Lead, Finance Analyst, Account Specialist, Talent Management Lead, Talent Acquisition Specialist, Learning and Development Specialist, Payroll Lead, and Payroll Analyst.	The operations team is responsible for administrative tasks that are indirectly linked to the core business activities.

RACI MATRIX

Table 17: RACI Matrix

Activity	CEO	CTO / PM	Product Lead	Dev Lead	Backend Dev	Mobile Dev	QA Engineer
Conduct stakeholder interviews	I	A	R	I	I	I	I
Prepare interview transcript	I	A	R	I	I	I	I
Conduct user research	I	A	R	I	I	I	I
Analyze user research findings	I	A	R	I	I	I	I
Conduct competitive benchmarking	I	A	R	I	I	I	I
Define the specifications of the product	I	A	R	C	I	I	I
Identification of available dataset	I	A	C	I	I	I	I
Collect and consolidate relevant food-related data	I	A	C	I	I	I	I
Annotate and label food items	I	A	C	I	I	I	I
Exploratory Data Analysis (EDA)	I	A	I	I	I	I	I

Activity	CEO	CTO / PM	Product Lead	Dev Lead	Backend Dev	Mobile Dev	QA Engineer
Data cleaning: outliers, NA, duplicates, inconsistencies	I	A	I	I	I	I	I
Data transformation: type conversion, scaling and normalization, etc.	I	A	I	I	I	I	I
Principal Component Analysis for dimensionality reduction	I	A	I	I	I	I	I
Split dataset (training, validation, testing)	I	A	I	I	I	I	I
Measure accuracy and precision	I	A	I	I	I	I	I
Generate confusion matrix	I	A	I	I	I	I	I
Conduct testing	I	A	I	C	I	I	R
Export the model to integrate with mobile development (TensorFlow Lite)	I	A	I	C	C	R	I
Development (15 sprints)	I	A	R	R	R	R	R
Align campaign objectives and KPIs	A	C	R	I	I	I	I
Identify target audience and personas	I	C	R	I	I	I	I
Stakeholder Engagement Review	I	A	R	I	I	I	I
Design visual assets	I	C	A	I	I	I	I
Define copy for materials	I	A	R	I	I	I	I
Create manual for the users	I	A	R	I	I	I	I
List frequent asked question	I	A	R	I	I	I	I
User manual	I	A	R	I	I	I	I
Knowledge transfer (KT) sessions	I	A	C	I	I	I	I
Prepare final project report	I	A	R	I	I	I	I
Create KPI (Key Performance Indicators) report	I	A	R	I	I	I	I
Conduct lessons learned session	I	A	C	I	I	I	C
Archive all project documentation	R	A	I	I	I	I	I

Activity	CEO	CTO / PM	Product Lead	Dev Lead	Backend Dev	Mobile Dev	QA Engineer
Review and close vendor contracts	R	A	I	I	I	I	I
Finalize Financial Accounts and Payments	R	A	I	I	I	I	I
Finalize contract closure documents	A	C	I	I	I	I	I
Submit final project report to stakeholders	R	A	I	I	I	I	I
Obtain formal sign-off from project sponsor	A	R	I	I	I	I	I
Closure	A	R	I	I	I	I	I

Table 17: RACI Matrix (continue)

Activity	UX/UI Designer	AI/ML Specialist	Data Analyst	Business Analyst	Nutritionist	Marketing Team	Legal Advisor
Conduct stakeholder interviews	C	I	C	R	I	I	I
Prepare interview transcript	C	I	R	R	I	I	I
Conduct user research	R	I	R	R	I	I	I
Analyze user research findings	C	I	R	R	I	I	I
Conduct competitive benchmarking	C	I	C	C	I	R	I
Define the specifications of the product	C	C	C	C	I	I	C
Identification of available dataset	I	R	R	C	I	I	I
Collect and consolidate relevant food-related data	I	R	R	C	R	I	I
Annotate and label food items	I	I	I	C	R	I	I
Exploratory Data Analysis (EDA)	I	C	R	C	I	I	I
Data cleaning: outliers, NA,	I	C	R	C	I	I	I

Activity	UX/UI Designer	AI/ML Specialist	Data Analyst	Business Analyst	Nutritionist	Marketing Team	Legal Advisor
duplicates, inconsistencies							
Data transformation: type conversion, scaling and normalization, etc.	I	C	R	C	I	I	I
Principal Component Analysis for dimensionality reduction	I	R	C	I	I	I	I
Split dataset (training, validation, testing)	I	R	C	I	I	I	I
Measure accuracy and precision	I	R	C	I	I	I	I
Generate confusion matrix	I	R	C	I	I	I	I
Conduct testing	I	C	C	I	I	I	I
Export the model to integrate with mobile development (TensorFlow Lite)	I	R	I	I	I	I	I
Development (15 sprints)	R	R	R	R	C	I	C
Align campaign objectives and KPIs	I	I	I	C	I	R	I
Identify target audience and personas	I	I	I	C	I	R	I
Stakeholder Engagement Review	I	I	I	C	I	C	I
Design visual assets	R	I	I	C	I	R	I
Define copy for materials	C	I	I	C	I	C	I
Create manual for the users	R	I	I	R	I	I	I

Activity	UX/UI Designer	AI/ML Specialist	Data Analyst	Business Analyst	Nutritionist	Marketing Team	Legal Advisor
List frequent asked question	C	I	I	R	I	I	I
User manual	R	I	I	C	I	I	I
Knowledge transfer (KT) sessions	C	I	I	C	I	I	I
Prepare final project report	C	I	I	R	I	I	I
Create KPI (Key Performance Indicators) report	C	I	I	R	I	I	I
Conduct lessons learned session	C	I	I	C	I	I	I
Archive all project documentation	I	I	I	C	I	I	I
Review and close vendor contracts	I	I	I	C	I	I	C
Finalize Financial Accounts and Payments	I	I	I	C	I	I	I
Finalize contract closure documents	I	I	I	I	I	I	R
Submit final project report to stakeholders	I	I	I	I	I	I	I
Obtain formal sign-off from project sponsor	I	I	I	I	I	I	I
Closure	I	I	I	I	I	I	I

Resource estimation and planning

Given the nature of the project, a hybrid project management approach has been adopted, combining predictive (waterfall) and adaptive (agile) methodologies. For the predictive phase, resource requirements have been estimated with a high degree of accuracy, based on clearly defined deliverables, timelines, and scope. In contrast, the resources allocated to the agile phase have been estimated using iterative planning techniques, reflecting the adaptive nature of sprints and backlog refinement. Consequently, while overall estimates provide a solid foundation for planning and budgeting, minor variations may occur as the team continuously adjusts to new insights and evolving project needs.

REFERENCE TO THE COST MATRIX/TABLE please review appendix 1

Resource Utilization and Leveling Histogram

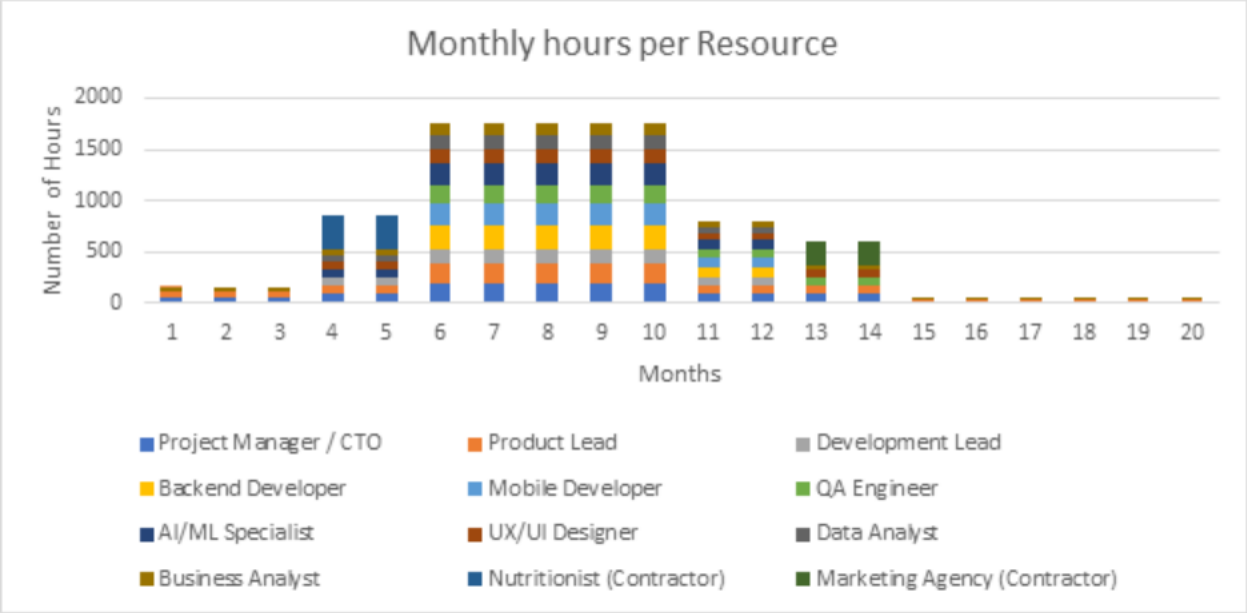


Figure 9. Histogram

The histogram above illustrates the monthly distribution of work hours per resource throughout the project lifecycle. During the initial predictive (waterfall) phase, resource utilization gradually increases as data collection, preprocessing, and model development activities are executed. This phase demonstrates a balanced allocation of resources, applying resource-leveling principles to ensure that no individual or role is overloaded.

From month six onward, the project transitions into the agile development phase, where most technical resources, including developers, data specialists, and designers, are engaged simultaneously in iterative sprints. The histogram shows a noticeable concentration of activity during this period, corresponding to the implementation and refinement of the application

modules. This alignment with sprint cycles reflects the adaptive nature of agile resource management, allowing workload adjustments through retrospectives and sprint reviews.

Toward the final months, resource demand decreases significantly, as the project enters the testing, documentation, and closure stages, where fewer roles (mainly managerial, QA, and marketing) are required. Overall, the distribution reflects a strategic hybrid approach that combines the predictability of waterfall planning with the flexibility of agile execution, ensuring resources are utilized efficiently across all project stages.

Resource Management Planning

The control and monitoring of resources in this project will ensure that human and material assets are effectively allocated, utilized, and adjusted throughout the project lifecycle. As the project follows a hybrid approach, the monitoring strategy integrates both predictive and adaptive control mechanisms to maintain performance within planned constraints.

During the predictive (Waterfall) phase, resource utilization will be monitored against the Resource Management Plan, the project schedule, and the Cost Baseline defined in the Cost Management Plan. The Project Manager/CTO will conduct periodic performance reviews and variance analyses to compare planned versus actual resource usage. When deviations are detected, such as resource overloads, underutilization, or schedule delays, corrective actions will be implemented through resource leveling and reallocation, ensuring that the project remains efficient and aligned with the established baselines.

In the adaptive (Agile) phase, control will be performed iteratively at the end of each sprint, using agile ceremonies (daily stand-ups, sprint reviews, and retrospectives) to evaluate capacity, workload, and productivity. The Development Lead, Scrum Master (Project Manager/CTO), and Product Owner will collaborate to monitor team velocity, identify bottlenecks, and adjust workload or sprint scope when needed. This iterative control enables continuous adaptation to evolving priorities and ensures sustainable team performance. However, to maintain cost control, a comparison between estimated and actual resource usage will also be conducted, allowing for adjustments and lessons learned to improve future planning accuracy.

Throughout the project, data from timesheets, burn-down charts, and progress dashboards will be used to maintain transparency and accountability. Regular reporting to the CEO and key stakeholders will provide visibility into resource performance, supporting informed decision-making. This integrated control approach will ensure that resources remain available, balanced, and optimized across all project phases, aligning operational efficiency with the project’s strategic objectives.

4.7 Communications Management Planning

Purpose

The Communication Management Plan guarantees a timely, accurate, and consistent flow of information between Innovative Consulting Group, FoodMart, and all key stakeholders. It outlines the communication objectives, stakeholders, methods, frequency, and responsibilities to foster collaboration, transparency, and agile decision-making throughout the project lifecycle.

Communication Management Approach

We will implement a mixed communication strategy designed to enhance clarity and collaboration throughout the project.

Predictive/Waterfall: This structured approach will be employed during the crucial early stages of the project, including defining requirements and planning. During this phase, we will share information through clearly organized documents, comprehensive reviews of key milestones, and formal reports. This method will ensure that everyone involved has the visibility needed to make informed decisions and maintain effective control over the project's direction.

Agile/Scrum: In contrast, this flexible approach will come into play during the development of the Minimum Viable Product (MVP). We will focus on frequent and open communication, fostering a spirit of collaboration within the team. Our efforts will center around engaging sprint reviews and actively seeking feedback, allowing us to refine our work and respond quickly to any changes or improvements needed.

Communication Management Constraints

- **Time:** The MVP must be delivered within 17 months. Communication activities must be efficient and avoid delays.
- **Budget:** Communication methods must fit within the fixed budget for development and pilot testing.
- **Client Involvement:** FoodMart stakeholders will not take part in daily Agile routines; they will only participate at stage gates, sprint reviews, and validation milestones.
- **Geographic Distribution:** Our teams and stakeholders are spread across various regions, which requires the use of digital tools as the primary channels for communication. We will control video conferencing, collaborative platforms, and project management software to ensure seamless communication and collaboration among all parties, despite geographical barriers.
- **Compliance:** All communications will be conducted in strict accordance with data protection laws and corporate confidentiality policies. This includes implementing secure communication channels and ensuring that all team members are trained in compliance requirements to protect sensitive information throughout the project.

Communication Methods and Technologies

This project uses a combination of predictive (structured) and agile (iterative) communication formats. Each channel has been selected to ensure clarity, transparency, and efficiency across

executive, managerial, technical, and end-user levels. Below is a description of the main communication formats and technologies referenced in the Communication Matrix.

Executive-Level Communications

- **Executive Meetings**: Formal high-level meetings with FoodMart leadership to review milestones, risks, and budgets, ensuring alignment with corporate strategy.
- **PDF, Biweekly, and Monthly Reports**: Written updates (PDF/PowerPoint) summarizing project status, milestones, KPIs, risks, and financial performance. These provide structured, auditable documentation.

Project Management & Coordination

- **PM Syncs**: Weekly coordination meetings between project managers (FoodMart and ICG) to align schedules, risks, and stakeholder communications.
- **Daily Stand-ups**: Short (15-minute) daily meetings for development teams to share progress, planned work, and blockers.
- **Biweekly Reports**: Summaries of project outcomes and risks prepared every two weeks, synchronized with Agile sprint cycles.

Technical Team Communications

- **Technical Review Meetings**: Structured sessions to discuss solution architecture, integrations, code quality, and risk resolution.
- **Jira**: Agile backlog and task management tool used to visualize sprint progress, priorities, and team ownership.
- **Slack**: Real-time messaging platform for quick updates, alerts, and issue escalation.
- **Tech Syncs**: Focused technical meetings (e.g., for AI/ML, AR, or backend) to align on specialized development topics.
- **GitHub Reviews**: Peer code reviews and pull requests conducted through GitHub to ensure quality, maintainability, and collaboration on code.

Design & User Experience Communications

- **Design Workshops**: Collaborative sessions involving designers, developers, and stakeholders to co-create user flows and interface solutions.
- **Figma**: Online design tool used for presenting, testing, and refining interactive prototypes.
- **Review Meetings**: Regular sessions to validate design progress and receive structured stakeholder feedback.
- **Test Sessions / Online Surveys**: User testing activities (e.g., pilot store shoppers) to gather usability and functionality feedback.

Expert & Advisory Communications

- **Validation Reports**: Formal documents from subject-matter experts (e.g., nutritionists) confirming data accuracy and credibility.
- **Finance Reports / Committee Updates**: Periodic updates tracking budget, financial KPIs, and variance against forecasts.
- **Legal Reports / Review Meetings**: Documents and sessions with internal and external legal teams to ensure compliance with national and international regulations.

Marketing & End-User Communications

- **Marketing Syncs / Reports**: Monthly meetings and reports aligning FoodMart's marketing campaigns with the app's rollout strategy.
- **In-App Communications**: Notifications, onboarding tips, and updates sent directly to app users during pilot and rollout phases.
- **Surveys / FAQs**: Digital surveys to capture user insights and FAQs to address common user questions quickly.

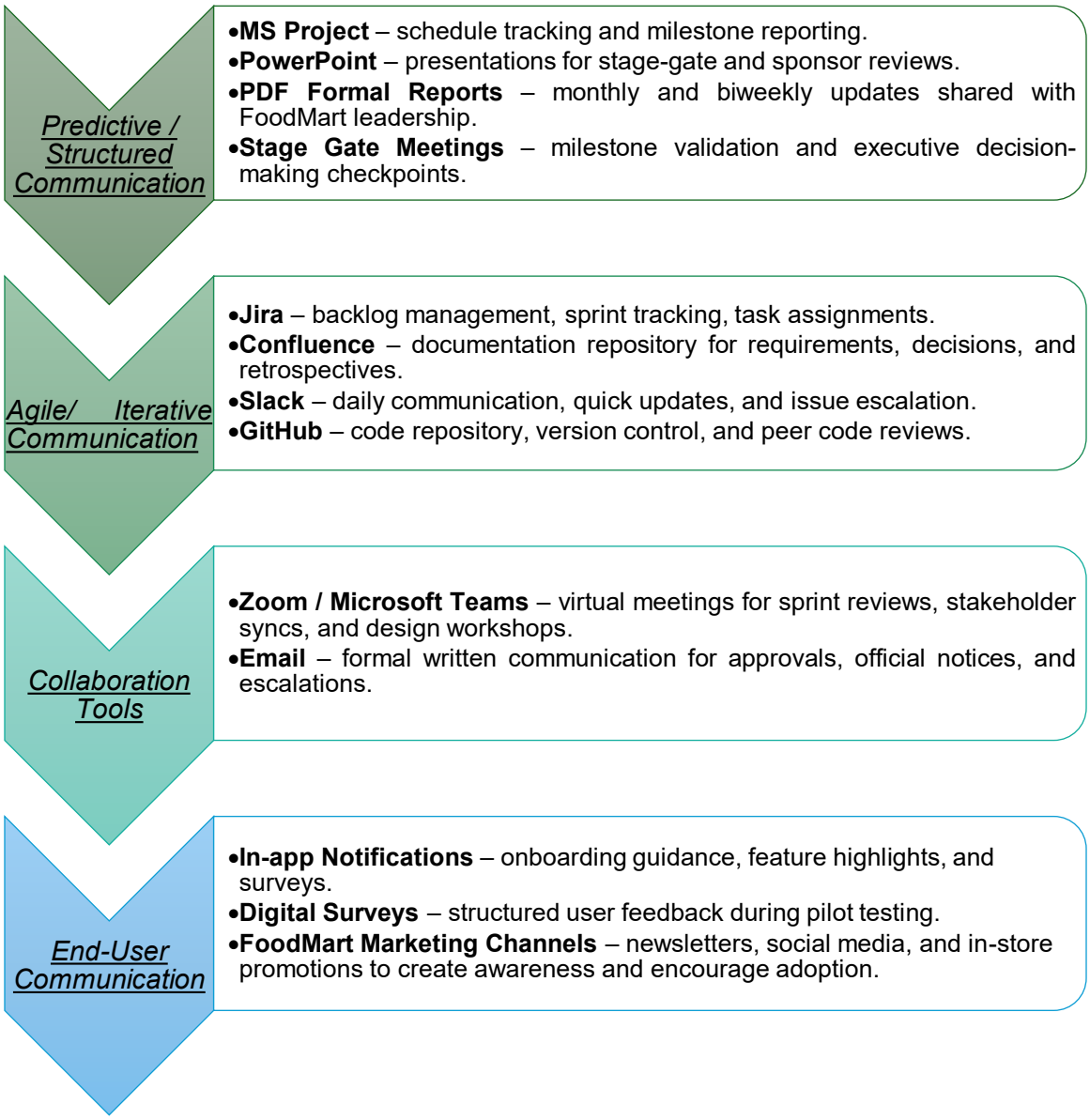


Figure 10. Communication Tools

Communication Matrix

Table 18: Communication Matrix

Stakeholder	Purpose	Information Needs	Format / Channel	Frequency	Owner
CEO FoodMart (Project Sponsor)	Ensure strategic alignment, decision-making	Milestones, risks, budget status, pilot KPIs	Executive Meetings, Steering Committee, PDF Reports	Biweekly + Monthly	Project Manager
Project Manager	Coordinate and manage the project	Overall progress, risks, schedule, stakeholder communications	PM Syncs, Daily Stand-ups, Biweekly Reports	Daily + Weekly	PMs (ICG + FoodMart)
Development Lead	Maintain technical integrity	Architecture, integration status, technical risks, code reviews	Technical Review Meetings, Jira, Slack	Weekly	Tech Lead
Mobile Developers	Deliver mobile features	Sprint goals, backlog priorities, blockers, AR integration tasks	Stand-ups, Jira, Slack	Daily	Scrum Master / Tech Lead
Backend Developers	Ensure backend readiness	API development status, database integration, blockers	Stand-ups, Jira, GitHub Reviews	Daily / Weekly	Tech Lead
UX/UI Designer	Validate user-centered design	Design priorities, user flows, feedback from reviews	Design Workshops, Figma, Review Meetings	Biweekly	UX/UI Lead
AI/ML Specialist	Ensure model quality & compliance	Model design, training accuracy, compliance updates	Tech Syncs, Reports, Slack	Weekly	Tech Lead
AR Developer	Implement AR functionality	AR feature integration, scanning performance, blockers	Dev Syncs, Jira, Demo Reviews	Weekly	Tech Lead
Nutrition Expert	Validate nutritional credibility	Nutritional content validation, accuracy reports	Review Meetings, Validation Reports	Monthly	PM + Nutrition Lead
Local Producer Lead	Ensure local product accuracy	Validation of local product info, nutritional data	Coordination Meetings, Email Updates	Monthly	PM
Business Analyst	Align features with business goals	Business requirements alignment, KPI definitions	Reports, BA Workshops	Monthly	BA Lead
Recruitment Team	Staff project team as required	Hiring needs, resource allocation	Emails, Recruitment Briefs	As Needed	PM + HR Lead

Stakeholder	Purpose	Information Needs	Format / Channel	Frequency	Owner
QA Engineers	Ensure product quality	Testing progress, bug reports, sprint deliverables	QA Syncs, Jira Reports	Weekly	QA Lead
UI/UX Testing Volunteers	Gather usability insights	Test instructions, surveys, usability feedback	Test Sessions, Online Surveys	Pilot Phase	QA Lead
Administrative Team	Provide support logistics	Internal logistics, documentation needs	Emails, Internal Memos	As Needed	PM + Admin Lead
Financial Team	Monitor financial health	Budget performance, financial KPIs	Finance Reports, Committee Updates	Quarterly	Finance Lead
Legal Department	Ensure compliance with laws	Compliance risks, regulatory updates	Legal Reports, Review Meetings	Quarterly	Legal Lead
External Legal Entities	Provide external compliance guidance	National/international compliance updates	Legal Memos, Reports	As Needed	Legal Lead
Marketing Team	Align market rollout	Launch strategy, communication campaigns	Marketing Syncs, Reports	Monthly	Marketing Lead
Final Users (Consumers)	Ensure adoption & feedback collection	Awareness, onboarding, feedback	In-app Comms, Surveys, FAQs	Pilot Phase	Marketing + PM

4.8 Risk Management Planning

The purpose of the Risk Management Plan is to define the approach, roles, processes, and tools that will be used to identify, analyze, respond to, and monitor risks throughout the lifecycle of the AI-based Nutrition Augmented Reality App project. Its purpose is to increase the probability of project success by proactively addressing uncertainties.

Based on the team experience, the Risk Management Plan compiles the risks that may be encountered during the project and the action plans associated that will be reviewed and monitored from the beginning. This plan will focus on minimizing negative impacts and maximizing opportunities increasing the probability of achieving the project objectives in terms of scope, schedule, cost and quality.

Scope

This Risk Management Plan will apply to the predictive phase including planning, data preparation and documentation as well as the adaptive phase including agile development, testing and launch. It will cover:

- Ensure risks are identified early and managed continuously.
- Establish a structured methodology for managing risks.
- Assign clear ownership and accountability for each risk.
- Define escalation mechanisms.

- Establish quantitative and qualitative risks evaluation criteria
- Minimize threats and maximize opportunities aligned with FoodMart's mission of conscious nutrition and sustainability.
- Ensure communication of risk status to stakeholders.

Roles and Responsibilities

Table 19: Roles & Responsibilities

Role	Risk Responsibilities
Project Sponsor	Approves risk management strategy and tolerance thresholds, reviews critical risks and authorizes contingency funds.
Project Manager	Oversees the risk management process, maintains the risk register, leads identification and analysis sessions and reports to the Steering Committee.
CTO	Own technical and cybersecurity risks.
Product Owner	Validates mitigations during sprints and identifies user experience, prioritizes the features and the backlog risks.
Development Lead	Oversees technical risk mitigation related to AI/AR integration, scalability, and performance.
QA Lead	Monitors quality assurance and testing risks.
HR Lead	Manages talent acquisition, retention, and training-related risks.
All Team Members	Responsible for identifying risks proactively, communicating new risks and supporting mitigation actions.

Risk Categories (RBS – Risk Breakdown Structure)

To ensure identification and management, it is possible to organize risks in the following hierarchical categories:

1. Technical Risks – AI/ML model accuracy, AR integration, scalability and data privacy.

This level includes technical risks such as model accuracy below thresholds, bias in training datasets, high computational costs for real-time processing, poor performance on low-end devices, compatibility issues with multiple operating systems (like iOS or Android), scalability limitations under high user loads, cloud service downtime, non-compliance with data regulations and data breaches during data collection or storage.

2. Project Management Risks – Scope creep, unrealistic schedules and vendor delays.

This level includes project management risks such as scope creep due to continuous feature requests, unclear definition of MVP requirements, delays in development and testing phases, overlapping tasks due to poor sequencing, underestimation of vendor or freelance consultant costs, currency fluctuations impacting international vendor contracts, ineffective change control and low stakeholder engagement in decision-making.

3. Financial Risks – Budget overruns, hybrid cost increases and cash flow imbalance due to milestone payments.

This level includes financial risks that arise due to the project's hybrid methodology, milestone-based payment structure and high technological uncertainty. Combining predictive and agile approaches may lead to overhead and unplanned costs and milestone payments may no align with the continuous cash outflow during development.

4. Resource Risks – Talent availability (AI/AR specialists), turnover and training gaps.

This level includes resource risks such as shortage of AI/AR specialists, high turnover of skilled developers, insufficient upskilling in TensorFlow, ARKit, or OWASP, failure of third-party vendors to deliver on time and dependency on a single vendor for critical components.

5. External Risks – Regulatory compliance on nutrition labeling and data protection, supplier participation.

This level includes external risks such as changes in nutrition labeling laws, stricter data privacy regulations, competitors releasing a similar app earlier, low engagement from local producers in providing data and incorrect or inconsistent nutritional information provided by suppliers.

6. Market Risks – Customer adoption, competitor solutions and usability acceptance.

This level includes market risks such as customers resisting AR-based shopping tools, low perceived value in using the app, poor UX/UI leading to abandonment and negative press or social media coverage due to ethical concerns (bias in AI, misleading nutrition advice).

7. Operational Risks – testing and quality, deployment, support and maintenance.

This level includes operational risks such as defect backlog leading to delayed release, insufficient coverage in automated testing, issues during MVP rollout to supermarkets, App store approval delays, and lack of clear post-launch support structure.

Table 20: RBS

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
All Sources of Project Risk	1. Technical Risks	1.1. AI/ML Models
		1.2. AR Integration
		1.3. System Architecture

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
		1.4. Data Security Architecture
	2. Project Management Risks	2.1. Scope
		2.2. Schedule
		2.3. Cost
		2.4. Governance
	3. Financial Risks	3.1. Budget overruns
		3.2. Funding problems
		3.3. Cash Flow Imbalances
	4. Resource Risks	4.1. Key personal turnover
		4.2. Limited skilled staff
		4.3. Delayed recruitment
	5. External Risks	5.1. Regulatory

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
		5.2. Market and Industry
		5.3. Suppliers
	6. Market and Customer Risks	6.1. Adoption
		6.2. Usability
		6.3. Reputation
	7. Operational Risks	7.1. Testing and Quality
		7.2. Deployment
		7.3. Support and Maintenance

Qualitative Analysis

To evaluate and prioritize risks by analyzing their probability of occurrence and potential impact on the project, the risk assessment matrix will be used. This tool will help to determine which risks require immediate attention and which can be monitored with less urgency.

Each factor (Impact and Probability) is rated on a scale of 1 to 5, where 1 represents the lowest level and 5 the highest level.

The severity score (1–25) is calculated by multiplying Impact × Probability. Risks with higher scores represent greater threats to the project and require more immediate attention. Any risk with a value equal to or greater than 15 will not be accepted in the project.

The following table shows the relationship between impact and probability, establishing a color scale to visually identify severity.

Table 21: Impact vs Probability Matrix

Impact \ Probability	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Initial Risk Register

Based on the different categories identified in the RBS defined in the previous section, the identified risks are classified and each one is assigned the severity of impact.

Table 22: Risk Register

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R1	5.1. Regulatory	The project plan assumes that suppliers will provide complete and verifiable nutritional data without prior contractual agreements	Suppliers refuse to provide data or provide incomplete data.	Regulatory non-compliance, need to rebuild the product database, and loss of end-user trust.	Threat	2	4	8	Mitigate	Negotiate binding contractual agreements with producers, validate and compare the information with the nutritionist.
R2	5.1. Regulatory	The scope definition assumes that allergen and ingredient data will be available on the producers' portal.	Lack of detail about allergens in records received.	Non-compliance with food regulations, possible sanctions and the need to redesign the nutritional information system.	Threat	3	5	15	Mitigate	Make allergen fields mandatory to include information and establish SLA clauses with producers to ensure that the data is complete.
R3	5.1. Regulatory	The project baseline does not contemplate state/local regulatory variations beyond the initial scope.	A local regulation changes and forces modifications to functionalities or policies.	Having to modify functionalities, adapt privacy policies, and allocate additional resources to regulatory compliance.	Threat	2	5	10	Mitigate / Escalate	Hire legal counsel to adopt and establish a contingency plan to adapt functions.
R4	1.4. Data Security Architecture	The project relies on the storage and processing of personal data without anonymization strategies already implemented.	Local legal requirements force data sharing/anonymization or reduce functionality.	Having to redesign the data architecture and the possibility of suffering from application functionalities tenders.	Threat	3	4	12	Mitigate	Implement pseudonymization/anonymization from the start and establish privacy policies

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R5	3.2. Funding problems	The financial forecast assumes macroeconomic stability and continuity of sponsor funding.	Recession or budget cuts reduce available funding, affecting the continuity or pace of development.	Reduction of scope, delays in deliverables, loss of human resources, or degradation of quality.	Threat	2	5	10	Accept / Mitigate	Define a clear MVP that allows delivering minimum functionalities in case of cutbacks and prioritize the backlog to ensure that critical functionalities can be developed.
R6	5.1. Regulatory	The quality plan assumes that food certifications and audits will be achieved with the current information.	Failure to meet required certifications or audits.	Delays in audits, recertification costs, and potential restrictions on operating.	Threat	2	4	8	Mitigate	Perform a regulatory compliance checklist and conduct internal audits to ensure compliance with food certifications.
R7	6.2. Usability	The design assumed in the requirements anticipates compliance with WCAG 2.1 AA, but there is no early accessibility testing.	The app does not meet accessibility requirements on critical routes.	Complaints, loss of users, and the need to redesign the interface to comply with WCAG standards.	Threat	3	4	12	Mitigate	Incorporate accessibility testing from the beginning and test with specific users with some type of disability to identify possible corrections to implement to ensure accessibility to all potential users.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R8	6.3. Reputation	The adoption strategy assumes good store ratings.	Early negative reviews reduce adoption.	Reduced adoption, reputational damage, and having to make quick improvements or image campaigns	Threat	4	3	12	Mitigate	Conduct tests with beta testers to identify issues early and track reviews to respond quickly to feedback.
R9	6.2. Usability	It is assumed that the interface will be intuitive for older users without specific testing.	Older users do not adopt the app due to poor usability.	Reduced product adoption and the need to redesign usage flows and support materials.	Threat	4	3	12	Mitigate	Simplify the application's operation by including an intuitive and easy-to-use front end, and take into account the elderly population during the testing phase to identify difficulties.
R10	1.4. Data Security Architecture	The architecture and operations assume full compliance with GDPR/CCPA without third-party validation.	Non-compliance or data breach that results in penalties.	Regulatory sanctions, loss of user trust, reputational impact, and possible service suspension.	Threat	3	5	15	Mitigate / Transfer	Conduct a penetration test and security audit before launching the app, sign Data Processing Agreements with anyone who handles or stores user information, adopt data encryption practices, and define a response plan with the steps to follow in the event of a security breach or personal data violation.
R11	5.2. Market and Industry	The business plan and marketing strategy are based on an initial market	Market validation users or initial metrics show low interest or little interaction from	Loss of sponsor confidence, budget reduction, or cancellation of	Threat	3	4	12	Mitigate	Carefully examine key assumptions about the target audience to truly understand what users want and design a value

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
		study that may have been limited or unrepresentative of the actual public.	target users during the pilot.	commercial scaling. It can also affect team morale or create pressure to quickly change the product's focus.						proposition that resonates with them. Also, consider different user segments that vary in age, technology profile, and consumption habits, beyond the initial defined group.
R12	1.2. AR Integration	The technical plan assumes that the AR features will function acceptably on most target devices.	Failure or poor performance of AR functions on real devices.	User dissatisfaction, increased uninstalls, launch delays, or the need to redesign the AR component.	Threat	3	4	12	Mitigate	Prototype and integrate the AR module with the application in an early stage to detect hardware limitations, identify library incompatibilities, and test performance. Also, design an alternative fallback interface that allows users to access basic functionalities if their device does not support AR or if this functionality fails. Finally, implement performance improvements in the AR components to improve battery and memory consumption, prevent crashes or unexpected closures, and ensure good visual quality.
R13	1.1. AI/ML Models	The schedule assumes availability of annotated datasets for training on scheduled dates.	Delay in delivery of annotated data for model training.	Schedule delays, reduced model accuracy (if trained with less data), or the need to temporarily use incomplete models.	Threat	3	4	12	Mitigate	Adopting techniques such as using artificially generated synthetic data or using models already trained on similar tasks and temporarily adapting them to be able to advance in training without completely depending on the annotated data.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R14	4.3. Delayed recruitment	From a staffing perspective, it is assumed that the hiring of specialists will proceed smoothly.	Delay in hiring key specialists for the development of the App.	Schedule extension, reduced team performance, loss of quality, or need to cut features.	Threat	2	4	8	Mitigate	Having a list of freelance workers who can temporarily join the project in case of need to fill critical vacancies, designing a quick and standardized onboarding process that allows new employees to integrate into the team and take on tasks in less time.
R15	1.3. System Architecture	The technical design assumes that AI models for food recognition can be efficiently packaged and run on mobile devices using TensorFlow Lite.	Technical limitations prevent the model from being packaged and run efficiently on mobile devices.	Low adoption, increased support tickets, need to redesign the architecture, or even delay in the pilot launch.	Threat	3	5	15	Mitigate	Conduct technical feasibility tests from early stages to check if the devices can simultaneously handle AI and AR workloads, apply AI model optimization techniques to reduce the processing and memory load on the device, and design the application to offer basic functionality in case the hardware does not allow all AI and AR functionalities to run simultaneously.
R16	3.1. Budget overruns	The budget baseline incorporates a limited contingency that may not cover scope creep costs.	Unforeseen costs increase spending beyond reserves.	Exceeding the total budget, requesting additional funds from the sponsor, reducing the scope, or losing the trust of stakeholders.	Threat	3	4	12	Mitigate	Continuously monitor EVM, PV, EV, and AC metrics to measure cost and schedule deviations in real time, enabling proactive corrective action before cost overruns escalate. Establish a change control policy that rejects or postpones changes that do not add critical value to the app. Finally, prioritize the backlog to ensure the delivery of key deliverables.
R17	1.4. Data Security Architecture	The project uses third-party SDKs and libraries that have not been thoroughly audited or validated for security and regulatory compliance.	An external dependency presents a vulnerability or security flaw that compromises the application or user data.	Security breach, reputational damage, regulatory non-compliance (GDPR/CCPA), or urgent need to uninstall modules and redo integrations.	Threat	4	5	20	Mitigate / Transfer	Evaluate the security of third-party repositories before integrating them, ensuring that only those with updated and audited components are selected. Also, integrate automated tools into the integration pipeline to detect vulnerabilities in code dependencies in real time.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
										Finally, establish a procedure for updating or rolling back external components in case of vulnerabilities or compatibility issues, thus enabling a rapid response to security problems.
R18	7.2. Deployment	The process of publishing in the App Stores is assumed to be automatic, without considering that Apple and Google apply very strict reviews, especially in Apps that handle personal data, use cameras or integrate AR/AI.	Rejection, suspension, or return of the application for correction due to technical errors, non-compliance with App Store/Play Store policies, or lack of documentation.	Delay in the pilot launch, build rework, cost overruns for corrections, and loss of credibility with the client or sponsor.	Threat	3	3	9	Mitigate	Review the updated App Store Review Guidelines (in the case of Apple) and Developer Policies (in the case of Google) before uploading each version of the application, standardize the publishing process in the App Store ensuring that all requirements are met, and define a response procedure in case the application is rejected.
R19	1.3. System Architecture	The infrastructure architecture assumes availability of hosting and cloud services without prolonged downtime.	A hosting server failure interrupts the availability of the application, affecting the user experience.	Temporary loss of service, reputational damage, loss of unbacked data, delays in testing, or cancellation of the pilot.	Threat	3	5	15	Mitigate / Transfer	Configure the infrastructure so that the application and its services are replicated across multiple regions or geographic areas of the cloud provider, ensuring that if one region fails, another can take over. Also, establish service-level agreements (SLAs) with the hosting provider, specifying minimum availability levels, incident response times, and escalation procedures. Furthermore, configure automatic backups and failover mechanisms to quickly restore operations in the event of outages or data loss. Finally, develop operational guidelines outlining the steps the technical team should follow in case of a

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
										system failure or infrastructure incident.
R20	1.4. Data Security Architecture	The data sources are multiple and vary in format, structure, and quality. There is no automated mechanism for validation, version control, or anomaly detection.	Users receive incomplete, contradictory, or erroneous information about food products, which creates a risk of regulatory non-compliance or loss of trust in the application.	Legal sanctions, reputational damage, low adoption, or the need to reprocess the entire database.	Threat	3	4	12	Mitigate	Define and integrate data quality control rules into the processes of loading, updating, and synchronizing the nutritional database to ensure that only complete, consistent records in a valid format are incorporated. Also, establish a periodic review by a nutritionist to validate the information. Finally, implement a historical record of all changes to the nutritional data and maintain previous versions available for auditing.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R21	1.1. AI/ML Models	The dataset used to train food identification models may not represent all categories, product types, or lighting and packaging conditions in a balanced way.	The model incorrectly classifies certain products or food types due to bias in the data or the model architecture. This leads to inconsistent results, low user confidence, and potential regulatory concerns.	Loss of accuracy, reputational damage, non-compliance with responsible AI principles, and potential rejection of the product by stakeholders.	Threat	3	4	12	Mitigate	Conduct AI model audits to identify and quantify potential biases in the dataset and model results, ensure the training dataset is balanced and diverse in both the number of examples and the variety of conditions, and test the model on specific subgroups to verify consistent performance across all segments. Finally, define a structured procedure to correct any detected bias through retraining or data labeling revision.
R22	5.3. Suppliers	The system architecture and implementation plan depend on services from specific providers (APIs, nutritional datasets, cloud services, etc.). There is no alternative plan or rapid replacement mechanism in case of failure or contract termination.	The provider interrupts service, changes its prices, or breaches the contract, affecting the availability of critical functions.	Service interruption, delivery delays, additional costs, or failure to meet project milestones.	Threat	3	4	12	Transfer / Mitigar	Design the architecture and procurement processes to avoid exclusive dependence on a single provider, enabling interoperability with alternative providers for critical services. Also, include specific clauses in supplier contracts that guarantee operational continuity, data access, and reasonable notice periods in case of termination or changes to terms. Finally, maintain temporary local copies of frequently used data or services to ensure basic functionality even if the external provider fails.
R23	1.3. System Architecture	The architecture considers the capacity to handle peak usage, simultaneous queries, or intensive workloads. However, the initial sizing was based on theoretical estimates or controlled environments, without realistic stress testing.	During launch, the application suffers from crashes, slowness, or excessive response times, especially in functions with high CPU or memory consumption.	Poor user experience, failures of key functionality, loss of trust, delivery delays, and potential cost overruns due to the need to scale emergency infrastructure.	Threat	3	4	12	Mitigate	Run load and stress tests that simulate real-world usage scenarios and extreme conditions to evaluate system performance before launch. Also, configure the infrastructure with automatic horizontal or vertical scaling mechanisms based on demand, so that system capacity automatically increases or decreases according to traffic. Additionally, review and optimize database queries and structures to improve response times. Finally, implement continuous monitoring tools and review key metrics such as CPU usage,

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
										memory usage, latency, errors, etc.
R24	7.2. Deployment	Initial deployment testing will take place at FoodMart's facilities, where the network infrastructure is not under the project team's control. There may be access restrictions, firewalls, bandwidth limitations, or intermittent outages.	During initial deployment testing, the application experiences slow load times, synchronization failures, or connection errors due to poor connectivity or incompatibility with the environment's network.	Poor user experience, perception of product instability, delays in validations, need to repeat tests, or loss of credibility with the partner.	Threat	3	3	9	Mitigate	Coordinate with FoodMart's IT department to establish pre-test connectivity and service level agreements during the pilot period, validating technical compatibility with the local network. Also, develop a basic offline mode that allows at least essential functions to be maintained in case of a temporary loss of connection.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R25	5.3. Suppliers	Deliverables (datasets, software modules, configurations, or scripts) are integrated into the system without rigorous validation or formal version control. Furthermore, onboarding processes for new collaborators or suppliers do not include identity verification or secure access authorization.	Corrupted, altered, or incomplete data or components enter the test or production environment, causing application failures, loss of information, or inconsistent results.	Functionality failures, data exposure, loss of customer trust, rework, and reputational risk due to visible errors in production.	Threat	3	4	12	Mitigate	Implement an automated validation process with manual reviews of deliverables before integration. Also, establish a process for registering and managing access for support or maintenance team members. Finally, apply version control mechanisms, digital signatures, and integrity verification to software packages before and after deployment.
R26	1.3. System Architecture	The various system modules (AI, AR, backend, frontend, database) and external services (data providers, nutritional APIs, storage) evolve independently without formal coordination. There are no standardized API contracts or automatic validations, which can lead to inconsistencies in format, changing endpoints, or compatibility errors.	When deploying a new version, one or more integrations may fail due to uncommunicated or incompatible changes between components. This can lead to cascading errors such as unsynchronized data, authentication failures, unresponsive functions, or partial service outages.	Delays in deployment, degradation of functionalities, increased costs, and deterioration of the perceived quality of the system.	Threat	4	4	16	Mitigate	Define and document API contracts that accurately describe the endpoints, data structures, error codes, and business rules between each module or system. Also, implement automated contract testing to verify that both the provider (API) and the consumer (app or module) adhere to the agreed-upon contract. Furthermore, utilize mock servers to enable development and testing even when the live service is unavailable or has not yet been updated. Finally, define a joint integration and deployment plan that synchronizes changes across teams, specifying responsibilities, delivery dates, dependencies, and rollback procedures.

Risk ID	RBS Category	Risk Root	Incident	Impact	Risk Type	Probability (1-5)	Impact (1-5)	Severity	Risk Response Strategy	Potential Risk Response Actions
R27	4.1. Key personal turnover	The project relies heavily on individual experts with specialized knowledge (e.g., in AI, AR, or data integration). There are no robust knowledge transfer mechanisms, structured documentation, or support staff, resulting in a dependency on specific individuals.	A key team member leaves the project or is unavailable for an extended period. This causes delays, loss of continuity, errors in deliverables, and rework.	Increased costs, milestone delays, quality degradation, and loss of tacit knowledge.	Threat	3	5	15	Mitigate	Establish as a project standard that all functions, components, and technical procedures must be documented in shared repositories (e.g., Confluence, Notion, or GitLab Wiki). Also, implement regular pair coding sessions and cross-code reviews among developers. Furthermore, define a formal handover process when someone leaves or changes roles on the project, including handover meetings, deliverable checklists, and replacement validation. Finally, designate backups for key roles and promote cross-training among team members to temporarily cover each other's responsibilities.

Quantitative Analysis

For risks identified with a severity score of 15 or higher, and whose response strategy is to avoid or mitigate, a cost will be incurred to either prevent the risk from occurring or to reduce the likelihood of it happening. The following table shows these risks, along with the response action and the estimated cost.

Table 23: Risk Cost Allocation

Risk ID	Risk	Action	Estimated Cost (USD)	Justification
R2	Lack of detail on allergens in records.	Establish SLA agreements with producers and conduct data compliance audits.	18,000	Cover legal and administrative costs for SLA contracts and data validations.
R10	Risk of personal data breach / GDPR-CCPA.	Hire for an annual security audit and penetration test.	25,000	US market price for pen testing and CCPA/GDPR compliance review.
R15	Technical limitations of AI models on mobile devices.	Compatibility and optimization testing of TensorFlow Lite models.	12,000	Test mobile applications on AWS Device Farm and adjust models so they are not too large or heavy.
R17	Vulnerabilities in third-party SDKs.	External dependency analysis service and bug bounty program.	28,000	Evaluate the security of third-party repositories before integrating them, ensuring that only those with updated and audited components are selected. Also, integrate automated tools into the integration pipeline to detect vulnerabilities in code dependencies in real time. Finally, establish a procedure for updating or rolling back external components in case of vulnerabilities or compatibility issues, thus enabling a rapid response to security problems.
R19	Hosting outages and interruptions.	Duplicate critical infrastructure (multi-region) and contract premium SLAs.	20,000	Contractual agreement with cloud provider (AWS/Azure) for redundancy and priority response and configuration of automatic backups and failover mechanisms to quickly restore operations in the event of outages or data loss.

Risk ID	Risk	Action	Estimated Cost (USD)	Justification
R26	Integration failures and inconsistent APIs	Implement contract testing between APIs and automated validation pipelines.	10,000	Postman/Newman licenses and technical effort to configure the automated pipelines that will run the tests to avoid incompatibilities between API and module versions.
R27	Loss of key personnel	Cross-training plan and formal documentation at Confluence.	8,000	Internal training and team time to document and rotate critical functions.
		TOTAL	USD 121,000	

A total of USD 121,000.00 will be allocated for the risks described.

On the other hand, for the other risks in the Risk Register that have been accepted, the Expected Monetary Value (EMV) technique has been applied to determine the contingency reserve that will be used in the project for the calculation of the final budget.

Table 24: Risk Response Planning using EVM

Risk ID	Incident	Prob (1–5)	Prob %	Severity	Assigned Impact (USD)	EMV (USD)
R1	Suppliers refuse to provide data or provide incomplete data.	3	0.6	12	6,833.33	4,100.00
R3	A local regulation changes and forces modifications to functionalities or policies.	2	0.4	10	5,000.00	2,000.00
R4	Local legal requirements force data sharing/anonymization or reduce functionality.	3	0.6	12	7,500.00	4,500.00
R5	Recession or budget cuts reduce available funding, affecting the continuity or pace of development.	2	0.4	10	6,250.00	2,500.00
R6	Failure to meet required certifications or audits.	2	0.4	8	3,000.00	1,200.00
R7	The app does not meet accessibility requirements on critical routes.	3	0.6	12	5,333.33	3,200.00
R8	Early negative reviews reduce adoption.	4	0.8	12	3,750.00	3,000.00
R9	Older users do not adopt the app due to poor usability.	4	0.8	12	3,750.00	3,000.00
R11	Market validation users or initial metrics show low interest or little interaction from target users during the pilot.	3	0.6	12	5,333.33	3,200.00
R12	Failure or poor performance of AR functions on real devices.	3	0.6	12	4,666.67	2,800.00

Risk ID	Incident	Prob (1–5)	Prob %	Severity	Assigned Impact (USD)	EMV (USD)
R13	Delay in delivery of annotated data for model training.	3	0.6	12	4,166.67	2,500.00
R14	Delay in hiring key specialists for the development of the App.	2	0.4	8	3,750.00	1,500.00
R16	Unforeseen costs increase spending beyond reserves.	3	0.6	12	5,000.00	3,000.00
R18	Rejection, suspension, or return of the application for correction due to technical errors, non-compliance with App Store/Play Store policies, or lack of documentation.	3	0.6	9	3,333.33	2,000.00
R20	Users receive incomplete, contradictory, or erroneous information about food products, which creates a risk of regulatory non-compliance or loss of trust in the application.	3	0.6	12	5,333.33	3,200.00
R21	The model incorrectly classifies certain products or food types due to bias in the data or the model architecture. This leads to inconsistent results, low user confidence, and potential regulatory concerns.	3	0.6	12	5,000.00	3,000.00
R22	The provider interrupts service, changes its prices, or breaches the contract, affecting the availability of critical functions.	3	0.6	12	7,500.00	4,500.00

Risk ID	Incident	Prob (1–5)	Prob %	Severity	Assigned Impact (USD)	EMV (USD)
R23	During launch, the application suffers from crashes, slowness, or excessive response times, especially in functions with high CPU or memory consumption.	3	0.6	12	4,666.67	2,800.00
R24	During initial deployment testing, the application experiences slow load times, synchronization failures, or connection errors due to poor connectivity or incompatibility with the environment's network.	3	0.6	9	3,333.33	2,000.00
R25	Corrupted, altered, or incomplete data or components enter the test or production environment, causing application failures, loss of information, or inconsistent results.	3	0.6	12	10,000.00	6,000.00
TOTAL					—	**USD 60,000.00**

The total EVM is of USD 60,000.00 and, to cover approximately the 80 percent of the risks, a contingency reserve of USD 48,000 is included in the cost baseline of the project.

Risk Monitoring & Reporting

The process of risk monitoring and reporting will involve continuous oversight, communication, and adaptation to changing project conditions.

During the predictive phases, risks will be reviewed in monthly Steering Committee meetings, while in the agile phases, risks will be assessed bi-weekly during sprint reviews, retrospectives and backlog refinements. Additionally, the Risk Register will be updated for new risks as well as for status updates in the existing risks.

Key metrics such as the percentage of high-priority risks with active response plans, the number of risks closed and the variance in schedule or cost attributable to risks will be monitored. Additionally, visual risks dashboards in Jira and MS Project will display open and high-priority risks, their severity levels, assigned owners and mitigation progress.

For reporting, a summary of the top 5 active risks, if they are increasing or decreasing and mitigation status will be included in each monthly progress report. Additionally, urgent or critical risks with a severity score higher than 20 will be escalated immediately to the Project Sponsor and Steering Committee through email or dedicated meetings.

The escalations paths will be:

- For operational risks, the Project Manager.
- For strategic or financial risks, the Project Sponsor.

4.9 Procurement Management Planning

Procurement Process

The procurement process for the project is designed to ensure transparency, cost-effectiveness, and adherence to organizational and regulatory standards. This process integrates both direct purchases and competitive bidding, selected according to the complexity and strategic importance of each acquisition. Direct purchases are applied for standardized or readily available resources such as software licenses and digital subscriptions, while competitive bidding is implemented for specialized or high-value services, including market research, nutrition and promotional materials.

The procurement framework is governed by the internal procedures of Innovative Consulting Group and FoodMart, which emphasize ethical sourcing, supplier qualification, and contractual compliance. Each procurement activity follows a structured approach that includes a make-or-buy analysis**,** supplier selection framework**,** and tender evaluation based on weighted criteria such as cost, delivery time, technical capability, vendor experience, and compliance with data protection and intellectual property regulations. Formal contracts are established for each purchase to define scope, deliverables, timelines, and acceptance criteria, ensuring accountability and quality assurance throughout the project lifecycle.

Acquisitions required

The planned acquisitions for the project include both goods and services that are essential for the successful development and deployment of the AI-based nutritional application:

- **Software licenses** and subscriptions for development and collaboration platforms.
- **Cloud hosting and server configuration services** provide secure, scalable infrastructure for backend deployment.
- **Technical equipment** such as laptops, peripherals, and mobile devices for AR/AI testing.
- **Nutrition data and functional content services** to ensure the app's information accuracy and reliability.

Marketing and promotional materials to support the product's launch campaign and user adoption.

Make-or-Buy analysis

Each acquisition has been justified through a make-or-buy analysis, confirming that outsourcing in these areas contributes to efficiency, cost optimization, and quality enhancement.

Table 25: Make or Buy Analysis

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
1.1 Project management (Predictive)	Initiating	Assumptions Document	Make	Standard PM activity
		Stakeholders Identification Document	Make	Standard PM activity
	Planning	Scope Management Plan	Make	Standard PM activity
		Requirements Management Plan	Make	Standard PM activity
		Schedule Management Plan	Make	Standard PM activity
		Time Managment Plan	Make	Standard PM activity
		Cost Management Plan	Make	Standard PM activity

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
		Quality Management Plan	Make	Standard PM activity
		Procurement Management Plan	Make	Standard PM activity
		Resource Management Plan	Make	Standard PM activity
		Risk Management Plan	Make	Standard PM activity
		Stakeholder Management Plan	Make	Standard PM activity
		Communication Managment Plan	Make	Standard PM activity
	Executing	Change Requests Document	Make	Standard PM activity
		Team Members Assessment Report	Make	Standard PM activity
		Meetings	Make	Standard PM activity
	Monitoring & Controlling	Monitoring Report	Make	Standard PM activity
		Change Requests Document	Make	Standard PM activity
		Lessons Learned Document	Make	Standard PM activity
	Scrum Development Phase (Agile)	Scrum role definition, ceremony schedule, initial backlog	Make	Standard PM activity
		User stories, product roadmap. Story point estimation	Make	Standard PM activity
		Sprint review notes, retroespctive actions,	Make	Standard PM activity

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
		burdoun and burnup chart, velocity report		
		Quality metrics, test results, technical logs	Make	Standard PM activity
	Closing	Closing Report	Make	Sensitive data and proprietary knowledge is involved
		Administrative Documents	Make	Sensitive data and proprietary knowledge is involved
		Lessons Learned Document	Make	Sensitive data and proprietary knowledge is involved
1.2 Foundation Phase (Predictive)	Product Discovery & Requirements	Interview transcript	Make	Internal team has the required skills and capacity
		Draft software requirement	Make	
		Product-Market Fit (PMF) document	Make	
		Competitive bechmarking report	**Make / Buy**	This activity requires you to purchase a subscription.
		Market analysis report	**Make / Buy**	The external provider is efficient due to expertise and possibility to scale up

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
		Users summary document	**Make / Buy**	This activity requires a Legal Advisor.
	AI Model Foundation (CPMAI)	Present the different datasets and databases	**Make / Buy**	This activity requires you to purchase a license and a subscription.
		Dataset details document	**Make / Buy**	A nutritionist will be responsible for validating the information for each product in the database. We are outsourcing this service because it is a one-time deliverable.
		Merge all the important databases	**Make / Buy**	
		Data overview report with descriptive statistics and main insights	Make	Internal team has the required skills and capacity
		Cleaned data set	**Make / Buy**	This activity requires you to purchase a license and a server.
		Data set with standarized and normalized data	**Make / Buy**	This activity requires you to purchase a server and a model training.
		Data set with relevant variables	**Make / Buy**	
		Deliver the cleaned data	Make	Internal team has the required skills and capacity

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
		Model Accuracy Results	Make	
		Confusion Matrix	Make	
		Report presenting the results	**Make / Buy**	This activity requires you to purchase a server, a license and a model training.
		Model with the format for mobile develoment	**Make / Buy**	This activity requires to purchase a hosting agrement.
1.3 Devlopment (Adaptative Methodology - Agile)	Epic: Technical Architecture & Infrastructure	CI/CD pipeline, cloud environment, API skeleton, automated tests.	Make	Internal team has the required skills and capacity
	Epic: Backend Development	Integrated TensorFlow Lite model, API endpoints, real-time inference.	Make	
	Epic: Mobile Application Development	Business logic, REST APIs, authentication services.	Make	
	Epic: Integration & Testing	iOS/Android front-end, ARKit/ARCore setup, secure login.	Make	
	Epic: Deployment & Launch Preparation	Automated test suites, security scans, performance monitoring.	Make	
	Epic: Quality and technical excellence	Beta builds, release notes, telemetry dashboards.	Make	

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
	Epic: Continuous Delivery	MVP pilot release, load/performance tests, app-store submission package.	Make	
1.4 Marketing & Launch (Predictive)	Launch Campaign	Campaign strategy document	**Buy**	The external provider is efficient due to expertise and possibility to scale up
		Presentation for the stakeholders	**Buy**	
		Survey	**Buy**	This activity requires you to purchase a license and a subscription.
	Create promotional materials	Flyers	**Buy**	The external provider is efficient due to expertise and possibility to scale up
		Banners	Make	Increases internal learning and expertise
1.5 Documentation & Training (Predictive)	User documentation	User manual	**Buy**	This activity requires you to purchase a license and a subscription.
		FAQs	Make	Increases internal learning and expertise
	Trainning	Guidelines and documentation	Make	Increases internal learning and expertise

WBS COMPONENT	WBS SUBCOMPONENT	DELIVERABLE LINKED	MAKE OR BUY ANALYSIS	JUSTIFICATION
		Training plan	Make	Increases internal learning and expertise
1.6 Project Closing (Predictive)	Final Review	Final report	Make	Sensitive data and proprietary knowledge is involved
		KPI Report	Make	Sensitive data and proprietary knowledge is involved
		Lessons learned	Make	Sensitive data and proprietary knowledge is involved
	Finalize administrative closure	Archived documentation	Make	Increases internal learning and expertise
		Legal acceptance document	Make	Sensitive data and proprietary knowledge is involved
		Finance report acceptance	Make	Increases internal learning and expertise
		Contract closure documents	**Make/ Buy**	This activity requires a Legal Advisor.
	Formal Project Acceptance	Final Project report and Handover of the project	Make	Sensitive data and proprietary knowledge is involved
		Sponsor Approval/signature	Make	Strategic alignment with project sponsor done internally
		Closure	Make	

Procurement schedule and Outsourcing estimation

The table below estimates the percentage of the project that will be developed by third parties (buy) versus internally (make), it is based on our Work Breakdown Structure (WBS) and includes a schedule outlining the acquisition timeline, start and end dates and estimated costs.

Table 26: Outsourcing Estimation

Category of Procurement	Total Estimated Cost (USD)		% of Total Project Budget (USD 823,360)	WBS Component	Start Date	End Date
	Purchase	Contract				
Market Research		$ 20 000,00	2,43%	1.2 Foundation Phase (Predictive)	13/05/25	19/05/25
Lauch Campaing and Promotional materials		$ 60 000,00	7,29%	1.4 Marketing & Launch (Predictive)	14/07/26	25/08/26
Legal Advisor		$ 10 000,00	1,21%	1.2 Foundation Phase (Predictive) 1.6 Project Closing (Predictive)	20/05/25	22/10/26
Nutrition data and functional content services		$ 15 000,00	1,82%	1.2 Foundation Phase (Predictive)	02/06/25	04/09/25
Subscription	$ 683,34		0,08%	1.2 Foundation Phase (Predictive) 1.4 Marketing & Launch (Predictive) 1.5 Documentation & Training (Predictive)	07/05/25	24 months later
Licenses	$ 1 224,75		0,15%	1.2 Foundation Phase (Predictive) 1.4 Marketing & Launch (Predictive) 1.5 Documentation & Training (Predictive)	28/05/25	24 months later
Hosting Agreement	$ 300,00		0,04%	1.2 Foundation Phase (Predictive)	29/08/25	24 months later
Model Training	$ 950,00		0,12%	1.2 Foundation Phase (Predictive)	02/06/25	24 months later
Server	$ 1 308,08		0,16%	1.2 Foundation Phase (Predictive)	02/06/25	24 months later

Description of the contracts and purchases

Market Research

The contractor shall carry out comprehensive Market Research and Brand Awareness Analysis to support the launch and positioning of the AI-Based Nutrition Augmented Reality App for FoodMart Supermarkets.

Table 27: Contract Requirement for Market Research

Dimensions	Specifications
Scope	• **Market and Consumer Analysis** - Conduct quantitative and qualitative research to evaluate consumer awareness, behavior, and attitudes toward nutrition-based mobile applications. - Identify target customer segments by age, income, health awareness, and sustainability preference. • **Competitive Benchmarking and Positioning** - Compare 3–5 major competitors in the health and sustainability app segment. - Assess differentiating factors in features, pricing, and engagement strategies. • **User Testing and Feedback Collection** - Conduct user testing with a minimum of 50 participants (in-store and online). - Gather feedback on app usability, content clarity, and perceived value.
Time	• Contract start date: 13/05/2025 • Planned duration: 5 days • Contract end date: 19/05/2025 • Schedule tolerance: ± 5 working days for non-critical path deliverables
Cost and Payment	Fixed-price contract: USD 20,000 Payment milestones: • Contract Signature (13/05/2025): USD 5,000 (mobilization payment) • Final Submission (19/05/2025): USD 15,000 (Final report and presentation)
Penalties / Incentives	• No penalty if deliverables meet quality and timing requirements • 2% deduction per day of delay, capped at 20% of the contract value. • No Incentive.
Deliverables and Acceptance	D1 – Market analysis and benchmarking report D2 – User testing and feedback summary D3 – Final market insights report and presentation • Acceptance criteria: - Review and approval by Project Manager & Product Owner - Evaluation within 5 business days of delivery

Launch campaign and Promotional Materials: Flyers and Banners

External providers are efficient due to expertise and the possibility to scale up. The reasons are described below:

- Numerous external agencies offer cost-effective, fast turnaround flyer design with high-quality results.
- External suppliers specialize in large-format design and printing, often offering competitive packages including installation/logistics.
- It avoids internal resource overload—outsourcing is efficient for tangible, creative outputs.

Table 28: Contract Requirements Launch Campaign and Promotional Materials

Dimensions	Specifications
Scope	The contractor shall deliver: • Graphic design of 2 flyers (English + Spanish versions) • Graphic design of 2 banners (English + Spanish versions) • Printing of 2,000 flyers (1,000 in each language) • Printing of 20 banners (10 in each language) • Digital formats of all deliverables suitable for website, email, and social media
Time	• Contract start date: 14/07/2025 • Planned duration: 1.5 months • Contract end date: 25/08/2025 • Schedule tolerance: ± 5 working days for non-critical path deliverables
Cost and Payment	Fixed-price contract: USD 60,500 Payment milestones: • Project start (14/07/2025): USD 5,000 (mobilization fee upon contract signature) • Deliverable 1 (30/07/2025): USD 25,000 (upon delivery and provisional approval of flyers) • Deliverable 2 (25/08/2025): USD 30,000 (upon final delivery and acceptance of banners and all related digital/print assets)
Penalties / Incentives	• No penalty if deliverables meet quality and timing requirements • From day 15 onward after any missed due date, the penalty will be of 2% per week, capped at 20% of total contract value (USD 12,500) • Incentive: early delivery bonus of USD 3,000 if all deliverables are submitted and accepted by 22/08/2025, with exceptional quality (as rated by Marketing and QA leads).
Deliverables and Acceptance	D1 – Flyers (English and Spanish): • Due date: July 30, 2025

Dimensions	Specifications
	• Contents: - Two flyer designs (1 per language), aligned with FoodMart branding - 2,000 printed flyers (1,000 in English, 1,000 in Spanish) - Digital versions for web and social media (PDF, PNG/JPEG, mobile-optimized) - Source design files (AI, PSD, or similar format) • Acceptance criteria: - Review and approval by FoodMart's Marketing Manager and Brand Compliance Officer - Approval within 5 business days of submission D2 – Banners (English and Spanish): • Due date: August 25, 2025 • Contents: - Two banner designs (English and Spanish) - 20 printed banners (10 per language), suitable for in-store roll-up display - Digital versions for promotional use (website, email, social media) - Source design files (AI, PSD, or equivalent) • Acceptance criteria: - Review and approval by Marketing Lead and Store Operations Team - Evaluation within 5 business days of delivery

Legal Advisor Services

Our organization currently lacks in-house expertise in legal and compliance management. Considering the sensitive nature of the data processed by our AI application, including personal dietary preferences, purchasing behavior, and potentially health-related information. This will ensure that all regulatory and contractual safeguards are both robust and professionally managed.

The specific legal documents and agreements involved necessitate expert legal guidance and oversight to ensure full compliance with applicable laws, particularly:

- Confidentiality Agreements: To protect proprietary business data, user data, and strategic information exchanged between Innovative Consulting Group and FoodMart.
- Data Privacy Agreement: To comply with data protection laws, ensuring consumer data is securely managed and ethically processed.
- Copyright and Ownership Documentation: To clearly establish IP ownership rights for the AI algorithms, user interface designs, content, and datasets generated or used during the project.

Table 29: Contract Requirements for Legal Advisor services

Dimensions	Specifications
Scope	Drafting and reviewing the following: - Mutual Non-Disclosure Agreements (NDAs) - Data Processing and Privacy Agreements - Copyright and IP Ownership Agreements - Regulatory compliance strategy for AI/data use (e.g., GDPR, CCPA) - Terms of Use and Privacy Policies for the end-user application Advising on potential legal risks related to AI and user data.
Time	• Planned duration: 17 months • **Key Milestones**: - Initial Legal Framework Draft: Month 1 - Finalized Legal Documentation: Month 5 - Ongoing Advisory and Compliance Support: Months 15–17
Cost and Payment	• Fixed-price contract: USD 10,000 - $5,000 fixed fee for document drafting and legal framework - $5,000 for advisory and revisions • **Payment Terms:** - 30% upfront - 40% upon delivery of final documentation - 30% upon project closeout or contract completion
Penalties	• Penalties: - 5% fee reduction per week for late delivery beyond agreed milestones (after 2-week grace) - Liability for damages arising from documented negligence or legal non-compliance.
Deliverables and Acceptance	• Deliverables: - Legally vetted and signed NDAs, privacy, and IP documents - End-user Terms of Service and Privacy Policy - Compliance roadmap with applicable data protection regulations • Acceptance Criteria: The legal advisors from both Innovative Consulting Group and FoodMart have reviewed and approved the documents. To facilitate a smooth implementation process, these documents must remain actionable and require no critical revisions.

Nutrition-Data & functional Content Services

Our organization lacks in-house expertise in nutritional science. Engaging, a qualified nutritionist will:

- Provide an evidence-based nutritional assessment that enhances the final product.
- Accelerate time-to-market by eliminating a steep learning curve.
- Ensure professional-grade data quality, which is critical to meeting the project's objectives.

The company's core competence is technology R&D; when deep domain knowledge is required, we strategically hire external specialists to protect scope and quality.

Table 30: Contract Requirements for Nutrition data and functional content services

Dimensions	Specifications
Scope	The contractor shall deliver: 1. A nutritional profile for each product in our catalogue, summarizing macro- & micronutrient contributions. 2. Target-group recommendations indicating who should increase or limit each product (e.g., diabetics, athletes). 3. all data in a structured database (CSV/SQL) compliant with the IT team's template.
Time	• Contract start date: 02-06-2025 • Planned duration: 3 months • Contract end date: 04-09-2025 • Schedule tolerance: + 2 weeks (no-fault window)
Cost and Payment	Fixed-price contract: USD 15,000 • Project start: USD 5,000 • Month 2: Deliverable 1: USD 5,000 • Month 3 – Acceptance of Deliverable 2: USD 5,000
Penalties / Incentives	• No penalty if deliverables are ≤ 14 days late. • From day 15 onward: USD 120/day deducted, provided the delay is solely attributable to the contractor.
Deliverables and Acceptance	• D1 - Nutritional database & recommendations (Excel/CSV + executive summary) • Acceptance testing: data-quality check, random recipe validation, sign-off by Project Manager & QA Lead.

License for development

The required software already exists on the market and would be expensive, time-consuming, and impractical to develop in-house.

- Commercial tools offer the stable and proven functionality needed for the project.
- Includes access to ongoing updates, patches, and support.

- Ensures legal use and licensing of AR/AI technologies and development tools.
- Ensures compatibility with Android/iOS and AI environments.

Table 31: Contract Requirements for License for development

Dimensions	Specifications
Scope	• Purchase to acquire software licenses necessary for app development, such as Figma, GitHub, design tools, AI, and AR SDKs. • Must include 24-month usage rights. • Multiuser access • Tools compatible with mobile development, AR and AI. • Platform: Web, Android and iOS • Number of users: < 15
Time	• Contract start date: 28/05/2025 • Activation deadline: 01/06/2025 • Schedule tolerance: + 2 weeks • Duration: 24 months
Cost and Payment	• Budget: $1 224,75 • Payment type: One-time upfront • Inclusions: license, technical support, upgrade • Tolerance: ±10% over base amount due to license type or number of users.
Penalties / Incentives	• Delay in activation of more than 7 days: 2% late delivery penalty. • Incompatibility with software: Immediate termination and refund. • Lack of support within SLA: USD $100 per missed support incident or delay.
Deliverables and Acceptance	D1: License key activation D2: User documentation D3: Support confirmation D4: Platform compatibility

Model Training

Training platforms for AI model development that would be costly and inefficient to build in-house.

- External GPUs provide GPU acceleration, large storage, and reliable performance.
- Eliminate on-premise infrastructure.

Table 32: Contract Requirements for Model Training

Dimensions	Specifications
Scope	• Access to model training platforms such as AWS SageMaker or Google Vertex AI to develop food recognition models.

	• Include storage and scalable resources. • GPU support. • Dataset Storage. • Compatible with Python.
Time	• Contract start date: 02/06/2025 • Schedule tolerance: ± 2 Weeks • Duration: 24 months, pay-as-you-go.
Cost and Payment	• Budget: USD $950 Pay-as-you-go model • Tolerance: ±15% depending on model training intensity and cloud GPU usage
Penalties / Incentives	• Failure to activate account on time: USD $20/day discount beyond deadline. • System outage of more than 4 hours: 5% service credit for affected month. • Exceeding usage: Notify user before applying for overage charges.
Deliverables and Acceptance	D1: Platform access credentials. D2: Usage dashboard. D3: GPU Access report. D4: Dataset storage provisioning.

Subscriptions

The tools required are industry-standard platforms already available on the market.

- Provides access to a collaborative platform for task tracking, communication, and sprint planning.
- Centralized project coordination with the team.
- Enables remote and asynchronous collaboration with version control and notifications.

Table 33: Contract Requirements for Subscriptions

Dimensions	Specifications
Scope	• Subscriptions to collaborative development and task management tools with multi-user access: Jira, Zoom, Slack, etc. • Must include 24 months use. • Access to all standard platform features: issue tracking, backlog, and boards. • Admin portal and billing access for management.

	• Technical support channel.
Time	• Contract start date: 07/05/2025 • Schedule tolerance: ± 2 Weeks • Duration: 24 months
Cost and Payment	• Budget: USD $683,34 • Payment type: One-time upfront • Inclusions: technical support, upgrade • Tolerance: ±10% over base amount due to license type or number of users.
Penalties / Incentives	• Downtime of more than 2 hours during the workweek: 5% credit of the subscription period.
Deliverables and Acceptance	D1: Subscription activation. D2: Admin panel access. D3: Documentation. D4: Support Access

Hosting agreement

- Contracting a cloud infrastructure service ensures scalable, secure, and reliable server resources to support development.
- Eliminate the cost of managing physical infrastructure.
- Provide security and backup for centers around the world.
- Enables continuous deployment and monitoring of development components.

Table 34: Contract Requirements for Hosting Agreement

Dimensions	Specifications
Scope	• Contract with a cloud provider: AWS or GCP that includes servers, databases, image storage, backend deployment, etc. • Must have configuration on scalability, security, and failover. • SLA ≥ 99.5% • Active monitoring. • 24/7 technical support. • Application backend deployment.
Time	• Contract start date: 29/08/2025 • Schedule tolerance: +1 weeks • Duration: 24 months, pay-as-you-go
Cost and Payment	• Budget: $300 • Payment type: Usage-based billing. • Tolerance: ±10% based on actual traffic, auto-scaling usage, or additional backups.
Penalties/ Incentives	• Delay on activation of more than 7 days: 2% late delivery penalty. • Incompatibility with software: Immediate termination and refund. • Lack of support within SLA: USD $25 per missed support incident or delay.
Deliverables and Acceptance	D1: License key activation D2: User documentation D3: Support confirmation D4: Platform compatibility

Server configuration

- Specialized external support makes sure that cloud infrastructure is set up and adjusted properly.
- This frees up team members to focus on the most important development activities.
- It makes sure that the environment for backend services and model hosting is always stable, secure, and working well.
- This helps avoid problems like incorrect configuration, downtime, or security issues during the deployment of MVP.

Table 35: Contract Requirements for Server Configuration

Dimensions	Specifications
Scope	• Initial technical configuration, startup support, performance tuning, and cloud infrastructure security, based on the MVP's technical requirements. • Must include restricted access, version control, and load testing. • Apply security protocols and environment hardening. • Coordinates with the hosting provider.
Time	• Contract start date: 02/06/2025 • Schedule tolerance: +1 week. • Duration: 24 months.
Cost and Payment	• Budget: $1 308,08 • Payment type: 50% upfront + 50% upon delivery (milestone-based payment) • Tolerance: ±5% if additional technical adjustments are required for post-integration.
Penalties/ Incentives	• Activation delay more than 1 week: 5% of contract value withheld per week of delay. • Incomplete documentation or access setup: Final payment hold until completion.
Deliverables and Acceptance	D1: Server and environment setup. D2: Deployment Configuration. D3: Documentation.

Supplier selection criteria

This section outlines the criteria for evaluating and selecting suppliers based on their experience, financial stability, technical expertise, and ability to provide reliable, cost-effective, and sustainable solutions that meet the project's technical, quality, and compliance requirements.

Table 36: Supplier selection criteria for Market Research

Category	Criteria Description	Weight (%)	Validation Method
Experience & Capability	Minimum 7 years of experience in market research, branding, and retail analytics.	20	Company profile, references
Technical & Operational Capacity	Proven ability to deliver within schedule (≤6 days tolerance).	30	SLA, operational plan
Financial Proposal	Competitive quotation ≤USD 20,000, aligned with project budget.	20	Financial offer comparison
Sustainability & Compliance	Use of recyclable materials and compliance with GDPR/CCPA standards.	10	Certifications, signed compliance statements
Research Quality	Methodological soundness and clarity of data analysis plan.	10	Proposal evaluation
Client Reputation	At least two positive references from previous projects or 90% satisfaction rating.	10	Reference letters, past performance records

Table 37: Supplier selection criteria for Nutrition data and functional content services

Category	Criteria	Weight	Validation Method
Professional Experience	Years of experience	10%	• ≥ 7 years [7=100, 6 =75, 5 = 50, 4 = 25, <3 = 0 points]
	Credentials	10%	• CVs & degrees (nutrition/dietetics) and Copies of licenses/registrations [100 or 0 points]
	Number of Projects	5%	• ≥ 1 project with North-American clients preferred and at least 3 projects executed [100, 50 or 0 points]
	Client references	5%	• 1 – 3 reference letters [3 satisfactory letters = 100, 2 letter = 75, 1 letters = 50 points, 0 letters = 0]

Category	Criteria	Weight	Validation Method
Ratings	Clients/Companies ratings	5%	• Online ratings or platform reviews [positive >90% = 100, 90- 75 = 50, <75% = 0 points]
Offer Quality	Price	25%	• Between 10,000 to 14,500 = 100 points • =15,000= 50 points • >15,000 or less than 10,000= 0 points
	Service guarantees	10%	• 10% financial guarantee/ Insurance [100 or 0 points]
Payment	Currency	20%	• USD [100 Points], Euros or Pounds [75 points], Other [0 points].
	Payment terms	5%	• >30 days [100 points], 30 – 15 days [50 points], < 15 days [0 points]
Location	Geographical Location	5%	• North America [100 points], South America, Central America Europe or Australia [75 points], Other [50 points].

Table 38: Supplier selection criteria for Launch Campaign and Promotional Materials

Category	Criteria	Weight	Validation Method
Operational	Logistics and distribution	30%	• Score 10 if the vendor operates in 3+ national distribution centers. • Score 7 if 1–2 centers. • Score <7 if no physical centers or outsourced distribution.
	Lead time	30%	• Score 10 if lead time from design approval to delivery is ≤3 working days. • Score 8 if 4–6 days. • Score ≤6 if >6 days or no clear commitment in SLA.
Financial	Cost	20%	• Score 10 if total cost is ≤USD 55,000. • Score 8 if between USD 55,001–60,000. • Score ≤6 if >USD 60,000 or lacks cost breakdown per deliverable.
Product Development	Sustainability options	10%	• Score 10 if uses ≥80% recycled materials and has 2+ eco-certifications (e.g., FSC, ISO 14001). • Score 8 if uses 50–79% recycled and 1 certification. • Score ≤6 if <50% or none.

Category	Criteria	Weight	Validation Method
	Design & Innovation	10%	• Score 10 if vendor presents ≥5 portfolio examples with custom, high-impact retail design. • Score 8 if 3–4 examples with modern tools. • Score ≤6 if <3 examples or low uniqueness.

Table 39: Supplier selection criteria for Legal Advisor Services

Category	Criteria	Weight	Validation Method
Professional Experience	Years of experience in tech, AI, and data privacy law	10%	≥ 7 years [7=100, 6=75, 5=50, 4=25, <3=0 points]
	Credentials & Certifications	10%	CVs of legal team, degrees in law, bar membership, certifications in data/privacy law (CIPP/E, CIPP/US, etc.) [100 or 0 points]
	Relevant Tech Industry Clients	5%	≥ 1 legal project for tech, SaaS, or AI company + at least 3 relevant projects executed [100, 50 or 0 points]
Ratings	Legal references or client endorsements	5%	1–3 reference letters (3 = 100, 2 = 75, 1 = 50, 0 = 0)
	Legal directories or online reviews	5%	Peer-reviewed or client-rated profiles [>90% = 100, 90–75 = 50, <75 = 0]
Offer Quality	Price	25%	Quoted price must be between USD 8,000 – 10,000 USD 8,000 – 9,500= 100; USD 9,501 – 10,000= 50; >10,000 = 0]
	Service Guarantees	10%	100% liability coverage or legal insurance for professional risk [100 or 0 points]
Payment	Currency	10%	USD [100], EUR/GBP [75], other [0 points]
	Payment Terms	10%	>30 days [100], 30–15 days [50], <15 days [0 points]
Location	Jurisdiction Knowledge & Local Presence	5%	Must be based in or familiar with North American legal system [NA = 100, SA/EU/AU = 75, Others = 0]
	Language & Communication	5%	Native or fluent English legal communication [100], Advanced [75], Intermediate or below [0]

Table 40: Supplier selection criteria for License for development

Category	Criteria	Weight	Validation Method
Vendor Qualification	Official Vendor Status, Authorized reseller/distributor	10%	• Review of official partner certification. • Validate through vendor registration on the official software provider's partner directory.
	Legal Compliance, Complies with IP and licensing laws	10%	• Review of licensing terms, legal disclosures, audit history, and terms of use.
Commercial Terms	Total cost including support/installation	10%	• Vendor quotation or proposal comparison (with breakdown of costs and renewal terms).
	Activation in 1–2 weeks	10%	• Implementation schedule in proposal, past client delivery timelines.
License Functionality	Commercial use, multi-user, scalable license model	10%	• Evaluation of license agreement features and scalability of terms.
Technical Support	Availability of real-time support and upgrades	15%	• Support SLAs, live chat/ticket demo, vendor references.
Platform Compatibility	Must work with Android Studio, AR SDKs, AI frameworks	35%	• Technical compliance sheet, trial license test, or prior case studies.

Table 41: Supplier selection criteria for model training

Category	Criteria	Weight	Validation Method
Vendor Qualification	Proven AI Platform Provider, Reputation and credentials	15%	Confirm the platform is offered by a major cloud vendor; check certifications and the public client list.
	Legal compliance, Licensing, data security, privacy	10%	Review SLA, data privacy policy, and terms of service.

Category	Criteria	Weight	Validation Method
Functional Capability	GPU & Dataset Support, High-performance compute and secure storage	20%	GPU availability, data encryption, and scalability. Confirm with the vendor for a free trial.
	Python compatibility, environment and libraries	20%	Request platform documentation for SDK/API support for Python.
Commercial Terms	Pay-as-you-go flexibility	20%	Analyze the cost model. Compare pricing tiers vs. estimated usage.
	Setup within 2 weeks	15%	Request an implementation timeline or SLA guarantee.

Table 42: Supplier selection criteria for Subscriptions

Category	Criteria	Weight	Validation Method
Vendor Qualification	Market Recognition	15%	Score 10 if platform is used by >100,000 orgs globally 7 if between 25k–100k 5 if 10k–25k <5 if fewer than 10k known clients
	Compliance & Legal, data protection and coverage	10%	Score 10 if compliant with GDPR, CCPA, ISO 27001, and includes detailed SLA terms Score 5–9 for partial coverage Score <5 if generic or unclear terms
Technical Capability	Collaboration tools, tracking, dashboards	20%	Score 10 if all key features are present. Score 7–9 if ≥80% covered. Score <7 for major gaps.
	Response time and channels offered	15%	Score 10 if 24/7 live chat + ticketing. 8 if 16/5. 5–7 for email only. <5 if delayed or outsourced support without SLAs.
Commercial terms	Pricing and Inclusions	20%	Between 600 to 682 = 100 points =683= 50 points >683 or less than 500= 0 points
	Activation Time	10%	Score 10 if access is delivered in ≤3 days. 8 if 4–5 days. 6 if 1 week. <5 if more than 1 week.

Category	Criteria	Weight	Validation Method
Usability & Admin	Admin Panel Access and Management Tools	10%	Score 10 if the admin dashboard includes user control, billing, and permission management. Score 7–9 for partial access. Score <7 if limited or unavailable admin tools.

Table 43: Supplier selection criteria for Hosting agreement

Category	Criteria	Weight	Validation Method
Vendor Qualification	Market Recognition	10%	Score 10 if market share >30% or 1M+ customers. 7–9 for 10–30%. <7 for small market share or low adoption.
	Compliance & Legal, data protection and coverage	10%	Score 10 if compliant with ISO 27001, SOC 2, HIPAA, GDPR Score 5–9 for partial coverage Score <5 if generic or unclear terms
Technical Capability	Scalability, failover, backend deployment	20%	Score 10 if supports auto-scaling, regional failover. 7–9 for partial capabilities. <7 if limited or missing.
	SLA & 24/7 Support	15%	Scores 10 if 24/7 support, SLA> 99% . 8 if 16/5. 7-9 moderate SLA and support. <7 if limited.
Commercial terms	Pricing and pay-as-you-go	15%	Score 10 for fully flexible usage billing. 7–9 for limited flexibility. <7 for fixed cost plans. Score <7 if price exceeds $300 or omits support/upgrades.
	Activation Time	10%	Score 10 if access is delivered in ≤2 days. 7-9 in 3-5 days. <7 if it takes more time or manual interventions.
Usability & Admin	Admin Panel Access and Management Tools	20%	Score 10 for billing, service control, and usage alerts. 7–9 for moderate admin tools. <7 if limited access

Table 44: Supplier selection criteria for Server configuration

Category	Criteria	Weight	Validation Method
Vendor Qualification	Experience	10%	Score 10 if the vendor has 5+ years of experience.
			7–9 for 3–5 years.
			<7 if less than 3 years.
	Cloud Skills and Certification	10%	Score 10 if the vendor holds certifications.
			7–9 if only partial.
			<7 if no certifications provided
Technical Capability	Configuration Scope: Load Testing, Access Control	25%	Score 10 if the vendor supports all.
			7–9 if support ≥75%.
			<7 if <75% supported.
	Security: encryption, firewall config, logging, audit trails	15%	Score 10 if it includes all.
			7–9 if partial.
			<7 if weak or no security protocols.
Commercial terms	Cost	10%	Score 10 if pricing is within budget.
			7–9 if slightly over or some scope trade-offs. <7 if cost is high for limited services

Supplier Evaluation Matrix

Market Research

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.

Contract award to the highest-scoring bidder.

Table 45: Supplier Comparison for Market Research

Criteria	InsightWorks	VisionPath Marketing Group	EcoScope Research Partners	MarketPulse Advisory
Experience & Capability	8 years – retail analytics and health-tech expertise	10 years – branding and retail intelligence	7 years – sustainability-focused consumer research	12 years – general market analysis (no AI/retail focus)
Technical & Operational Capacity	Proven on-time delivery (≤ 5 days tolerance)	Adequate capacity with moderate flexibility	Small team, may require extended lead time	Large firm, risk of delays due to bureaucracy
Financial Proposal (USD)	19,500	21,000	18,000	28,000
Sustainability & Compliance	GDPR/CCPA compliant, recyclable data reports	GDPR compliant, limited ESG focus	Strong ESG alignment, carbon-neutral operations	GDPR compliant only
Research Quality / Methodology	Strong quant-qual design, AI consumer insights	Robust methods, less focus on AR/AI context	High quality but limited sample scale	Standard approach, less innovation
Legal & Contract Compliance	Excellent references (≥ 90 % satisfaction)	Good references (≈ 85 %)	Positive references (≈ 80 %)	Mixed references (≈ 75 %)
Client Reputation / References	8 years – retail analytics and health-tech expertise	10 years – branding and retail intelligence	7 years – sustainability-focused consumer research	12 years – general market analysis (no AI/retail focus)

Launch campaign and Promotional Materials: Flyers and Banners

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 46: Supplier Comparison for Launch campaign and promotional materials

Category	Criteria	Eleven Studios	Momentum Group	UrbanSeed Media
Operational	Logistics and distribution	Operates 3 regional hubs in the USA with nationwide coverage and partnerships with sustainable freight providers. 97% delivery success rate.	Has a centralized distribution center in Texas, offers fast shipping in southern states, but limited in northern zones.	Small distribution footprint: only 1 warehouse in Illinois, uses third-party logistics with less control over sustainability and timeliness.
	Lead time	Offers 3–4 business day delivery to most regions. Uses predictive AI to optimize delivery routes and minimize delays.	Guarantees 2-day delivery for southern states, but 5–6 days for northern/east coast. Some delays reported in peak seasons.	Lead time is highly variable (4–7 business days). Delivery delays are common, especially during seasonal peaks.
Financial	Cost	Offers competitive pricing, USD 58,000 for campaign delivery. Offers no hidden fees, but includes sustainability premium (~5%).	Mid-range cost: USD 62,500. Includes design, print, and logistics. Payment terms are 50% upfront, 50% upon delivery.	Low-cost bid: USD 55,000. However, some deliverables (design materials) are excluded or charged as optional add-ons, which could increase total costs.
Product Development	Sustainability options	Uses 100% recycled materials in all promotional items. Also offers CO2 offsetting certificates for campaigns.	Promotional materials are 70% recyclable; partially use soy-based ink. Focus on reducing packaging waste.	No specific sustainability practices. Uses standard materials, not certified sustainable. Cost-efficient but environmentally weak.
	Design & Innovation	In-house UX/UI and marketing team	Leverages third-party design	Offers basic templates and pre-

Category	Criteria	Eleven Studios	Momentum Group	UrbanSeed Media
		develops custom, user-centric campaigns. Uses AI-powered A/B testing to refine material.	agency. Delivers modern but somewhat standard promotional styles, with limited iteration options.	designed visuals. No customizations unless paid extra. Limited design innovation.

Legal Advisor services

- Request for Proposal (RFP) issued to pre-qualified candidates (Americas / Europe).
- Bids assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Total Score Interpretation

- 90–100 points: Excellent candidate, high legal assurance
- 75–89 points: Acceptable with minor risks or trade-offs
- 60–74 points: Caution — legal/compliance exposure possible
- <60 points: Not recommended

Table 47: Supplier Comparison for Legal Advisor services

Category	Criteria	LexAI Legal	Marta Rivas, Esq.	LegalTech Partners	Regula Group
Professional Experience	Years of experience	12	6	8	3
	Credentials	Certified specialists in tech law, privacy, and IP	JD + CIPP/E	Certified lawyers, startup experts	Only basic law degree
	Number of projects	10 projects in AI and e-commerce in USA and Canada	3 projects in USA	6 projects in Latin America and USA	2 small projects in Europe
Ratings	Client references	3 letters	2 letters	2 letters	1 letter
	Online reviews	9.5/10	8/10	7.5/10	6.5/10
Offer Quality	Price	$8,500	$12,000	$11,000	$9,500
	Service guarantees	Yes	No	Yes	No
Payment	Currency	USD	USD	MXN	Euros
	Payment terms	>30 days	30 days	60–90 days	<15 days

Location	Legal jurisdiction / Local presence	USA	USA	Mexico	Germany
	Language & communication	Native English	Native English	Advanced English	Intermediate English

Nutrition-Data & functional Content Services

- Request for Proposal (RFP) issued to pre-qualified candidates (Americas / Europe).
- Bids assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 48: Supplier Comparison for Nutrition data and functional content services

Category	Criteria	Nutrion Lab	Dr. Lisa McClair	Ali Group	Nutrifit
Professional Experience	Years of experience	6	20	4	9
	Credentials	All members of the team are licensed nutritionists.	PhD in Nutrition	They only hold coaching certificates.	The team is composed of certified nutrition coaches, chefs, and a food engineer.
	Number of projects	3 USA projects and 2 international projects.	More than 15 projects around the world and +1000 patients.	10 projects in South America.	6 projects in Europe, 2 in USA and 3 in other countries.
	Client references	2 letters of recommend ation.	3 letters of recommendat ion.	1 Letter of recommenda tion	2 letters of recommenda tion
Ratings	Clients/ Companies ratings	4.5/5 rating	9.5/10 rating	7/10 rating	8.5/10 rating
Offer Quality	Price	$ 16,000.00	$ 15,000.00	$ 9,500.00	$ 14,000.00
	Service guarantees	Yes	No	Yes	Yes
Payment	Currency	USD	USD	MXN	Euros
	Payment terms	60-30 days	30-15 days	60-90 days	60-30 days

Category	Criteria	Nutrion Lab	Dr. Lisa McClair	Ali Group	Nutrifit
Location	Geographical Location	USA	USA	Mexico	Germany

License for development

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 49: Supplier Comparison for License for development

Category	Criteria	CodeOneSoft (USA)	Versionnware (Germany)	Open LATAM (Chile)
Vendor Qualification	Official Vendor Status, Authorized reseller/distributor	Atlassian Gold Partner	Authorized Google Cloud Reseller	No official Status
	Legal Compliance, Complies with IP and licensing laws	Standard EULA + SLA	GDPR & EU IP-compliant	Generic T&Cs only
Commercial Terms	Total cost including support/installation	$1,220	$1,500	$1,200
	Activation in 1–2 weeks	5 business days	10 business days	3 weeks
License Functionality	Commercial use, multi-user, scalable license model	17 users, commercial use	20 users, enterprise terms	10 users, commercial use
Technical Support Platform Compatibility	Availability of real-time support and upgrades	24/7 chat and phone	Email + tickets	Emails
	Must work with Android Studio, AR SDKs, AI frameworks	✓	✓	Partial – Not Support Android

Model Training

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 50: Supplier Comparison for Model Training

Category	Criteria	AWS SageMaker	Google Vertex AI
Vendor Qualification	Proven AI Platform Provider, Reputation and credentials	• Offered by Amazon Web Services. • Leader in AI/ML cloud platforms.	- Offered by Google Cloud. - Adopted in health, retail, and research sectors.
	Legal compliance, Licensing, data security, privacy	SOC 2, ISO 27001, HIPAA, GDPR, CCPA compliant.	ISO 27001, SOC 2, HIPAA, GDPR compliant.
Functional Capability	GPU & Dataset Support, High-performance compute and secure storage	Offers p3/p4 GPU instances, large-scale data lakes with S3 integration. Encrypted at rest and in transit.	Offers A100 and T4 GPU support, scalable storage with Google Cloud Storage. Full encryption & secure buckets
	Python compatibility, environment and libraries	Fully supports Jupyter, PyTorch, TensorFlow, Hugging Face, and built-in Python SDK.	Fully supports Jupyter, TensorFlow, PyTorch, AutoML; integrated with Colab and SDKs
Commercial Terms	Pay-as-you-go flexibility	Fully pay-as-you-go: hourly usage for compute and storage	Fully pay-as-you-go, with hourly and per-job billing.
	Setup within 2 weeks	Self-service setup available instantly. Full deployment in <1 day with account.	Self-service activation. Project creation setup within 1–2 days

Subscriptions

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 51: Supplier Comparison for Subscription

Category	Criteria	Slack	Atlassian
Vendor Qualification	Market Recognition	Used by over 750,000 companies	Over 200,000 active customers

Category	Criteria	Slack	Atlassian
	Compliance & Legal, data protection and coverage	SOC 2, ISO 27001, GDPR, CCPA, HIPAA compliance. Detailed SLA included	ISO 27001, GDPR, SOC 2, strong SLA and security posture
Technical Capability	Collaboration tools, tracking, dashboards	Channels, integrations, task tracking	Full task tracking, boards, backlog, dashboards, integrations
	Response time and channels offered	24/7 support	Business hours ticketing, 24/7 premium, SLA
Commercial terms	Pricing and Inclusions	±$7/user/month, includes full messaging + 10 integrations	±$8–$14/user/month depending on plan, includes Jira, Confluence, admin tools
	Activation Time	Immediate access after payment	Activation in 24–72 hours depending on user count and permissions
Usability & Admin	Admin Panel Access and Management Tools	Admin console, billing, user access roles	Admin console, billing, user access roles

Hosting Agreement

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 52: Supplier Comparison for Hosting Agreement

Category	Criteria	AWS	GCP (Google Cloud Platform)
Vendor Qualification	Market Recognition	Largest cloud provider globally	2nd largest globally
	Compliance & Legal, data protection and coverage	ISO 27001, SOC 2, HIPAA, GDPR	ISO 27001, SOC 2, HIPAA, GDPR

Category	Criteria	AWS	GCP (Google Cloud Platform)
Technical Capability	Scalability, failover, backend deployment	Auto-scaling groups, regional failover	Auto-scaler, Kubernetes, Cloud Functions
	SLA & 24/7 Support	24/7 support. SLA > 99.95%	24/7 support. SLA > 99.95%
Commercial terms	Pricing and pay-as-you-go	Pay-as-you-go by instance/time/storage	Hourly + usage-based. Discount available.
	Activation Time	Immediate provisioning with a verified account.	Immediate provisioning
Usability & Admin	Admin Panel Access and Management Tools	AWS Console + CLI	GCP Console + gcloud CLI

Server Configuration

- Bids are assessed using the above weighting matrix. Each bidder will be evaluated on a scale of 100 points.
- Contract award to the highest-scoring bidder.

Table 53: Supplier Comparison for Server Configuration

Category	Criteria	ServerCOnf	DeployIP
Vendor Qualification	Experience	7 years of experience	3 years of experience
	Cloud Skills and Certification	AWS Certified Solutions Architect + ISO 27001 compliance	GCP Associate Engineer; no ISO certification
Technical Capability	Configuration Scope: Load Testing, Access Control	Supports restricted, Git-based versioning, automated deployment & load testing	Manual deployment, no load testing, no CI/CD pipeline

Category	Criteria	ServerCOnf	DeployIP
	Security: encryption, firewall config, logging, audit trails	Configures SSL/TLS, custom firewall rules, and audit included	Enables basic encryption, minimal firewall rules, no logging dashboard
Commercial terms	Cost	USD $1,300 for full scope	USD $1,100 flat rate

Supplier Evaluation Matrix

Table 54: Supplier Evaluation Matrix for contracts

SUPPLIER EVALUATION MATRIX FOR CONTRACTS														
Purpose of Contracts			Weighted Scoring Method								**Method of**	**Score: Minimum**		**Score: Maximun**
Name			***Nutrition-Data & Recipe-Content Services***								**Assesmen**	1		100
Percentage:of:Weighting:by:Criteria:			10%		10%		5%		5%		5%		25%	
No	**Supplier**	**Approved**	**Years of experience**		**Credentials**		**Number of Projects**		**Client references**		**Clients/Companies ratings**		**Price**	
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted
1	**Nutrion Lab**	-	75	7,5	100	10	100	5	75	3,75	50	2,5	50	12,5
2	**Dr. Lisa McClair**	-	100	10	100	10	100	5	100	5	100	5	0	0
3	**Ali Group**	-	25	2,5	0	0	50	2,5	50	2,5	0	0	100	25
4	**Nutrifit**	X	100	10	100	10	100	5	75	3,75	50	2,5	100	25

Percentage:of:Weighting:by:Criteria:			10%		20%		5%		5%		100%
No	**Supplier**	**Approved**	**Service guarantees**		**Currency**		**Payment terms**		**Geographical**		**Total**
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	**Nutrion Lab**	-	100	10	100	20	100	5	100	5	81,3
2	**Dr. Lisa McClair**	-	0	0	100	20	50	2,5	100	5	62,5
3	**Ali Group**	-	100	10	0	0	100	5	75	3,75	51,3
4	**Nutrifit**	X	100	10	75	15	100	5	75	3,75	**90,0**

Name			***Market Research***												
Percentage:of:Weighting:by:Criteria:			20%		30%		20%		10%		10%		10%		100%
No	**Supplier**	**Approved**	**Experience & Capability**		**Technical & Operational Capacity**		**Financial Proposal**		**Sustainability & Compliance**		**Research Quality**		**Client Reputation**		**Total**
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	**InsightWorks (USA)**	X	90	18	90	27	100	20	90	9	90	9	100	10	**94,0**
2	**VisionPath Marketing Group (USA)**	-	80	16	80	24	90	18	80	8	80	8	80	8	84,0
3	**EcoScope Research Partners (CAN)**	-	70	14	70	21	100	20	100	10	80	8	80	8	84,0
4	**MarketPulse Advisory (USA)**	-	70	14	70	21	70	14	70	7	70	7	70	7	74,0

Name		*Launch campaign and Promotional Materials: Flyers and Banners*											
Percentage:of:Weighting:by:Criteria:			30%		30%		20%		10%		10%		100%
No	**Supplier**	**Approved**	**Logistics and distribution**		**Lead Time**		**Cost**		**Sustainability**		**Desing & Innovation**		**Total**
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	**Eleven Studios**	X	100	30	100	30	90	18	100	10	100	10	**99,0**
2	**Momentum Group**	-	70	21	80	24	100	20	80	8	80	8	83,0
3	**UrbanSeed Media**	-	50	15	50	15	70	14	50	5	50	5	57,0

Name		*Legal Advisor Services*											
Percentage:of:Weighting:by:Criteria:			10%		10%		5%		5%		5%		25%
No	**Supplier**	**Approved**	**Years of experience**		**Credentials & Certifications**		**Relevant Tech Industry Clients**		**Legal references**		**Legal directories or online reviews**		**Price**	
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted
1	**LexAI Group**	X	100	10	100	10	100	5	100	5	100	5	100	25
2	**Marta Rivas. Esq**	-	75	7,5	100	10	50	2,5	75	3,75	50	2,5	50	12,5
3	**LegalTech Partners**	-	100	10	100	10	100	5	75	3,75	50	2,5	100	25
4	**Regula Group**	-	0	0	0	0	0	0	50	2,5	0	0	0	0

Percentage:of:Weighting:by:Criteria:			10%		10%		10%		5%		5%		100%
No	**Supplier**	**Approved**	**Service guarantees**		**Currency**		**Payment terms**		**Jurisdiction**		**Language &**		**Total**
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	**LexAI Group**	X	100	10	100	10	100	10	100	5	100	5	**100,0**
2	**Marta Rivas. Esq**	-	0	0	100	10	50	5	100	5	100	5	64
3	**LegalTech Partners**	-	100	10	0	0	0	0	100	5	75	3,75	75
4	**Regula Group**	-	0	0	75	7,5	0	0	75	3,75	0	0	14

Table 55: Supplier Evaluation Matrix for Purchases

SUPPLIER EVALUATION MATRIX FOR PURCHASES																
Purpose of: Purchases	Weighted Scoring Method												**Method of Assesment**			
Name	***Software Licenses***												**Score: Maximun**	100	**Score: Minimum**	1
Percentage:of:Weighting:by:Criteria:			10%		10%		10%		15%		35%		10%		10%	100%
No	Supplier	Approved	Official Vendor Status		Price		License Scope		Technical Support		Compatibility		Delivery Time		Legal Compliance		Total Weighted
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	CodeOneSoft	X	9	0,9	9	0,9	9	0,9	10	1,5	10	3,5	8	0,8	8	0,8	9,3
2	Versionnware	-	9	0,9	4	0,4	7	0,7	7	1,05	10	3,5	6	0,6	8	0,8	7,95
3	Open Latam	-	5	0,5	9	0,9	4	0,4	5	0,75	5	1,75	4	0,4	4	0,4	5,1

Name	***Model Training***													
Percentage:of:Weighting:by:Criteria:			15%		10%		20%		20%		20%		15%	100%
No	Supplier	Approved	Proven AI Platform Provider, Reputation		Legal Compliance		GPU and Dataset Support		Python Compatibility		Pay-as-you-go		Setup	Total
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted		
1	AWS SageMaker	X	10	1,5	8	0,8	8	1,6	8	1,6	9	1,8	9	1,35	8,65	
2	Google Vertex AI	-	8	1,2	8	0,8	7	1,4	7	1,4	7	1,4	8	1,2	7,4	

Name	***Subscriptions***															
Percentage:of:Weighting:by:Criteria:			15%		10%		20%		15%		20%		10%		10%	100%
No	Supplier	Approved	Market Recognition		Legal Compliance		Collaboration tools, tracking, dashboards		Response time and channels offered		Pricing and Inclusions		Activation Time		Admin Panel Access and Management Tools		Total
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	Slack		10	1,5	9	0,9	8	1,6	8	1,2	8	1,6	10	1	9	0,9	8,70
2	Attlasian	X	10	1,5	7	0,7	10	1	9	1,35	10	3,5	9	0,9	10	1	9,95

Name	***Hosting Agreement***															
Percentage:of:Weighting:by:Criteria:			10%		10%		20%		15%		15%		10%		20%	100%
No	Supplier	Approved	Market Recognition		Legal Compliance		Scalability, failover, backend deployment		SLA & 24/7 Support		Pricing and pay-as-you-go		Activation Time		Admin Panel Access and Management Tools		Total
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	AWS	-	10	1	10	1	10	2	10	1,5	9	1,8	10	1	10	1	9,30
2	GCP	X	9	0,9	9	0,9	9	0,9	9	1,35	10	3,5	10	1	9	0,9	9,45

Name	***Server Configuration***										
Percentage:of:Weighting:by:Criteria:			10%		15%		25%		25%		25%	100%
No	Supplier	Approved	Experience		Cloud Skills		Configuration Scope		Security		Costo	Total
			Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	Points	Weighted	
1	ServerCOnf	X	10	1	9	1,35	9	2,25	9	2,25	10	2,5	9,35
2	DeployIP	-	7	0,7	8	1,2	7	1,75	8	2	10	2,5	8,15

5. Project monitoring and control

Effective project management control is essential for ensuring that the AI-Based Nutrition Augmented Reality App was delivered on time, within budget, and in alignment with strategic objectives. Given the complexity and innovation-driven nature of the project, a hybrid control approach was adopted, combining predictive methods for structured planning and agile techniques for iterative development.

This section outlines the mechanisms used to monitor and manage scope, schedule, cost, resources, quality, and risks throughout the project lifecycle. It details how control processes were tailored to each phase, how performance was tracked using Earned Value Management (EVM) and agile metrics, and how change management was integrated to respond to evolving requirements.

5.1 Integrated Change Management Planning

Integrated change management planning ensures that any project modification is evaluated, approved, and implemented in a controlled and coordinated manner. Requested modifications can affect scope, cost, quality, schedule, risk, quality control, as well as deliverables. This plan integrates both predictive and agile methodologies to maintain project integrity in response to change. This ensures that modifications are consistent with project objectives and strategic alignment.

A situation will be considered a change when it affects the project scope or adds new functionality, for example, adding new features to the mobile application or modifications to the AI model; also, changes to the work plan that exceed the delivery time, budget variances or cost overruns, quality requirements (e.g., adding more precision to the AI model or changing the user interface to make it more intuitive), and the materialization of risks that change resources or artifact delivery times.

Changes can originate from various sources, such as the client during validation or deliverable phases, when incidents have been identified during the testing process, or risks that require mitigation or contingency actions.

Change Management Planning in Predictive Phase

In the predictive phase, changes are controlled and documented, managed through a formal change control system under the supervision of the Project Manager. This includes documentation such as the Change Request Form, Impact Assessment, and Change Approval Record. All modifications must be approved by the Steering Committee before implementation.

The following diagram describes the change control flow: Request, Assess, Approve, Document, and Implement:

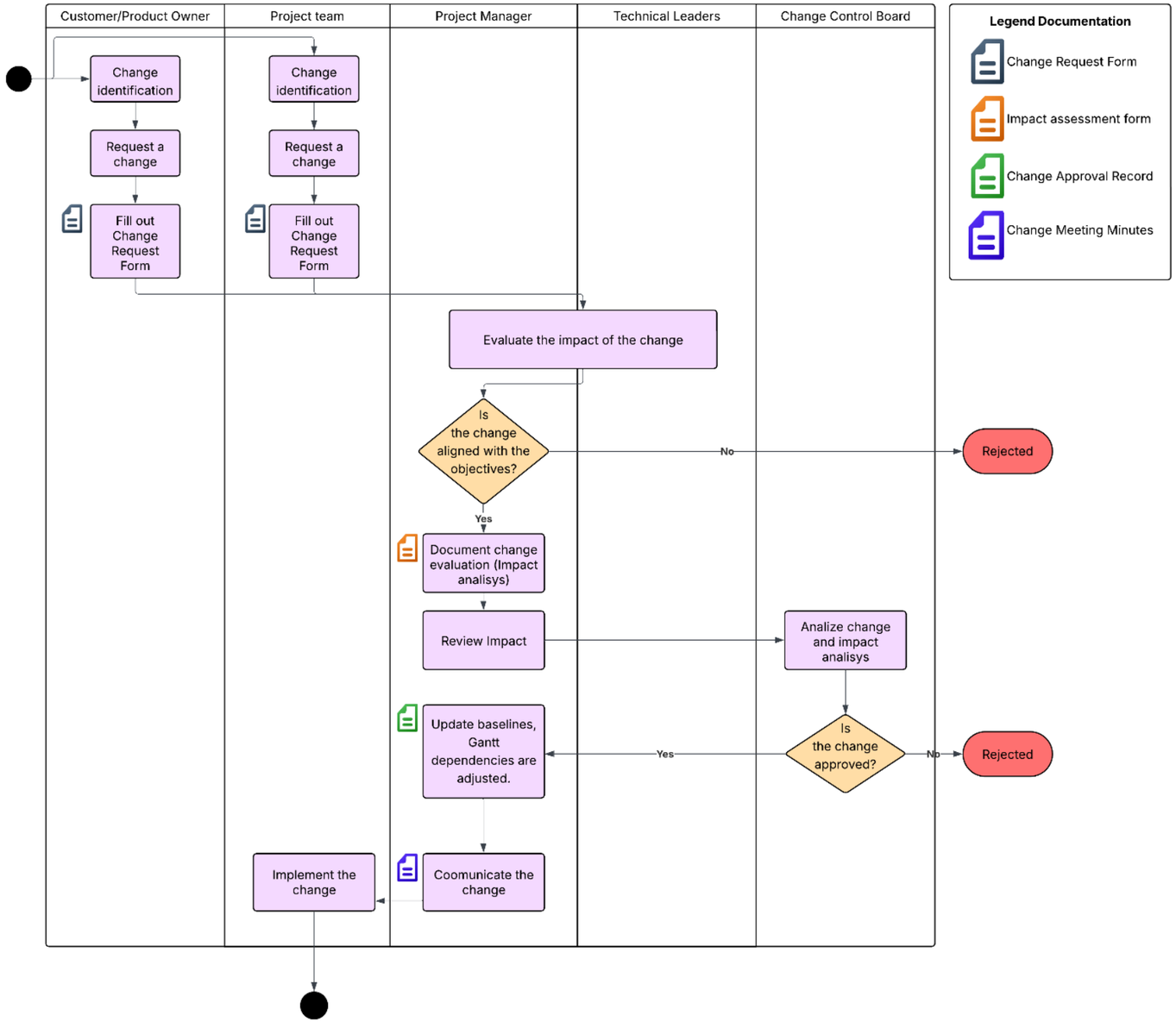


Figure 11. Change Management flow diagram

Roles and Responsibilities for Integrated Change Management – Predictive:

Before making a change, all changes must be documented and analyzed, approved or rejected according to the project's objectives. It is important to understand that team members play an important role in ensuring changes are implemented without causing major impacts on the project, so it is important to define the roles involved in these changes.

Table 56: Roles & Responsibilities related to Change

Role	Responsibilities related to change
Project Manager	He is a central coordinating actor for all changes, ensuring that all changes are recorded. He facilitates communication with stakeholders, the technical team, and involved parties. He is also responsible for completing the change request form, impact assessment, change approval, and change meeting minutes.
Change control board	The project manager, Development Leaders, and stakeholders are involved; they assess the impact on scope, cost, and/or schedule and perform the change analysis. The decisions are recorded in the Change Record.
Development Lead	Provides a technical assessment of the change, including the level of effort, technical risks, and feasibility. Identifies baseline dependencies and impacts.
Stakeholders / Product Owner / Project team	Could initiate the change request, participate in change review meetings to understand expectations, and approve or validate the change.

Monitoring and Controlling Activities – Predictive

For the predictive methodology, monitoring and controlling activities are focused on ensuring that all project changes are documented, approved, and aligned with the baseline scope, time, and cost. For change control to work, the following must be done:

1. Maintain a centralized change repository, stored in Confluence, to record requested changes, whether approved or rejected. This must be updated and reviewed by the project manager. The form to be completed is the Change Approval Record.

2. The project uses Earned Value Management (EVM) to measure and control performance against the baseline. Metrics such as Cost Variance (CV), Schedule Variance (SV), and Performance Indexes (CPI, SPI) are calculated regularly to assess how approved changes have impacted cost efficiency and schedule performance.

3. The project manager prepares monitoring reports that summarize project performance, including change-related impacts, schedule and cost variances, and risk updates. These reports

are submitted to the Steering Committee on a regular basis (monthly or per phase) to provide executive visibility.

The following are the forms for managing integrated change for the predictive methodology.

Change Request Form: The objective is to record the change, describe what is being requested, and explain why it is necessary.

Project Title:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change Request ID:	CR-###
Date Submitted:	(DD/MM/YYYY)
Requested By:	(Name / Role / Organization)
Contact Information:	(Email / Phone)
Change Type:	(Scope , Schedule. Cost, Quality, Risk, Resource)
Change Category:	(Corrective, Preventive, Enhancement, Risk Response, Client Request)
Description of the Requested Change:	Provide a concise description of the proposed change, including context and rationale.
Reason/Justification:	Explain why the change is needed (e.g., client feedback, risk materialization, compliance, improvement).
Affected Components:	Identify which deliverables, milestones, or systems are impacted.
Submitted To:	(Project Manager / PMO / Steering Committee)
Attachments:	Any supporting document
Status:	(Submitted, Under Review, Approved, Rejected)

Impact assessment form: Once the change has been requested, the impact on the project is assessed.

Project Title:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change Request ID:	CR-###
Date of Assessment:	(DD/MM/YYYY)
Assessed By:	(Name / Role)

Summary of Change:	(Brief description of the change under evaluation)
Impact Areas	**Description of Impact**
Scope	(Describe how project deliverables or requirements are affected.)
Schedule	(Describe the impact on project timeline, milestones, or sprint schedule.)
Cost	(Estimate potential cost increase/decrease or required budget adjustment.)
Quality	(Indicate if product quality, testing, or standards are affected.)
Resources	(Indicate additional human or material resources required.)
Risks	(Note new risks introduced or existing ones intensified.)
Dependencies	(Mention affected tasks, modules, or teams.)
Overall Impact Summary:	Provide a concise overview of the combined effect of this change.
Recommended Action:	(Approve, Reject, Defer, Request Further Analysis)
Prepared By:	(Project Manager / Development Lead)
Reviewed By:	(PMO / Quality Manager)

Change Approval Record: After assessing the impact, the steering committee or project manager makes the decision on whether to approve the change.

Project Title:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change Request ID:	CR-###
Date of Decision:	(DD/MM/YYYY)
Decision Authority:	(Steering Committee / PMO / Project Sponsor)
Change Title:	(Short descriptive title)
Summary of the Change:	(Brief summary of the change approved or rejected.)
Decision:	(Approved, Rejected, Deferred)
Approval Type:	(Full, Conditional)
Conditions / Comments:	(State any requirements for approval or reasons for rejection.)
Baseline Updates Required:	(Schedule, Scope, Budget, Quality Plan, Risk Register, Documentation)
Responsible for Implementation:	(Name / Role)
Implementation Start Date:	(DD/MM/YYYY)

Monitoring and Reporting Mechanism:	(Describe how the change will be tracked—e.g., progress reports, sprint review, or milestone tracking.)
Signatures:	
Project Manager	
PMO Representative	
Steering Committee Chair	

Change Meeting Minutes: The discussions, evaluations, and decisions made during the change control process are communicated to the team through minutes.

Project Title:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Meeting Title:	Change Control Meeting
Meeting ID:	CCM-###
Date:	(DD/MM/YYYY)
Time / Duration:	(Start-End Time)
Attendees:	(List of names, roles, organizations)
Chairperson:	(PM / PMO)
Related Change Request(s):	CR-###
Discussion Summary:	Describe key points raised, evaluations made, and alternative solutions considered.
Actions Agreed:	List tasks to be completed, responsible parties, and due dates.
Next Review Date:	(DD/MM/YYYY)
Prepared By:	(Name / Role)
Approved By:	(PM / PMO / Steering Committee)

Change Management Planning in Agile Phase

In the Agile Development phase, changes are managed iteratively through backlog refinement sessions and sprint reviews, where new requirements or adjustments are collaboratively prioritized and estimated. If there are significant changes to the project (scope, schedule, or budget), these will be evaluated to continue implementing the changes comprehensively, ensuring the agile methodology is consistent.

The following diagram describes the change control flow: Request, Assess, Approve, Document, and Implement.

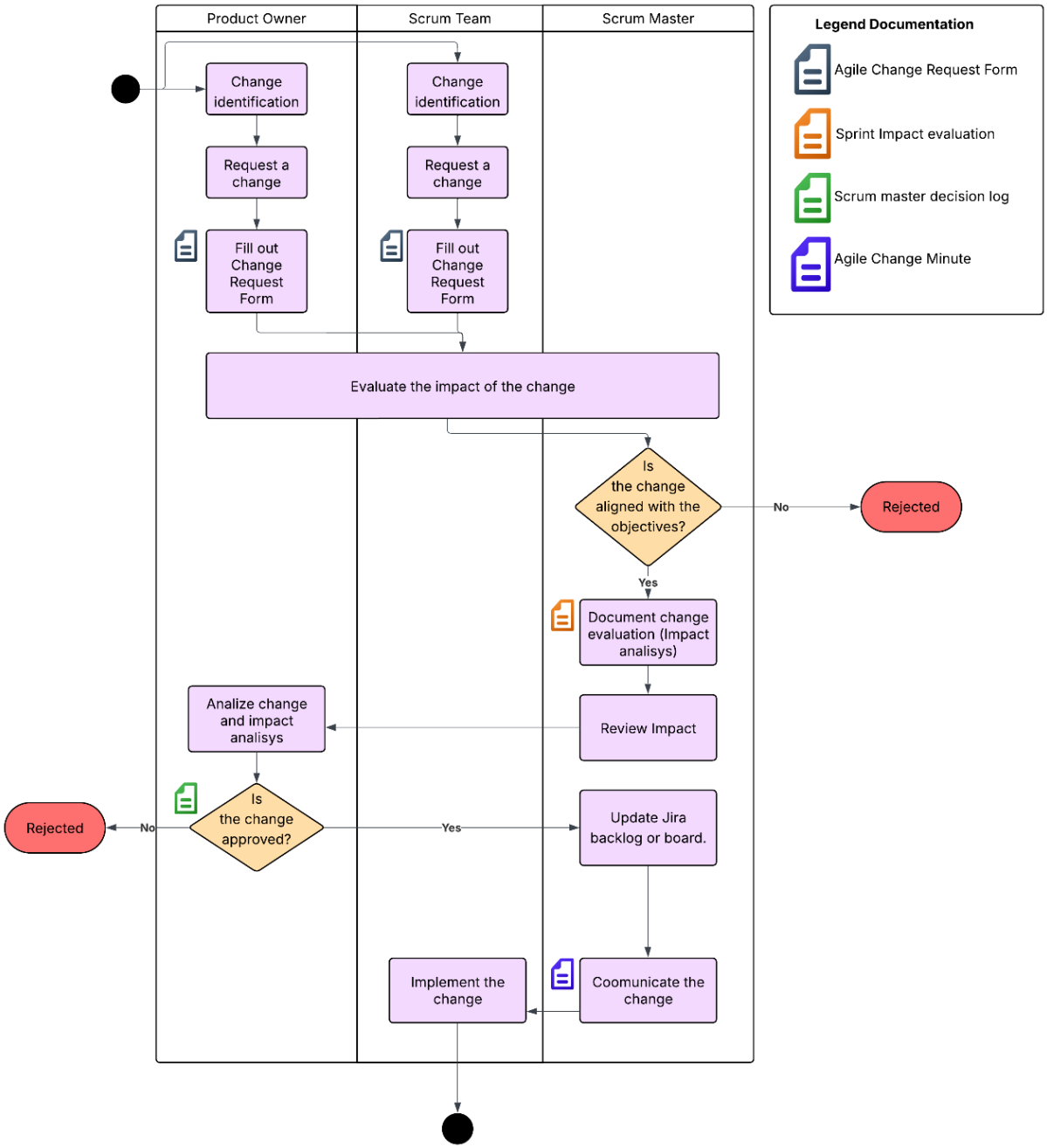


Figure 12. Change Management Agile flow diagram

Roles and responsibilities for integrated change management – Agile:

Table 57: Roles & Responsibilities for Integrated Change Management (Agile)

Roles	Responsibilities related to change management
Product Owner/Project Sponsor	During the agile lifecycle, the product owner serves as the change decision-maker, prioritizing and reorganizing the product backlog based on stakeholder input. He or she maintains communication with the project manager/Scrum master to reflect changes and updates in the backlog. He or she documents decisions in the agile change discussion.
Scrum Master	Facilitates the change process in the Scrum process, ensures proper communication with the team and stakeholders, monitors progress using the burndown and burnup chart, and ensures that blockers caused by changes can be resolved. Guides the team through continuous improvement in Sprint retrospectives.
Development team / Scrum team	Provide technical input during the change impact assessment, identify dependencies, implement changes, and update tasks on the scrum board.
Stakeholders	Provide feedback on changes or new requirements, participate in the sprint review to validate changes, and request changes through the product owner.

Monitoring and Controlling Activities – Agile

In the agile development phases, monitoring and control are managed through continuous inspection and adaptation. The process is transparent and requires team collaboration to achieve rapid feedback and incremental improvement. Monitoring and control during this phase is carried out through the following mechanisms:

1. All modifications, such as new user stories, backlogs, or bugs, are recorded in Jira and Confluence to ensure visibility of the changes.

2. Velocity charts, workflow charts, and backlog analysis will be used to evaluate performance. This shows how much work has been completed versus what remains, allowing the team to identify potential deviations and adjust workload and priorities.

3. During the sprint review, the team and stakeholders will evaluate the results of the implemented changes. They will discuss whether the change meets expectations, how it impacted the sprint, and whether any adjustments are needed.

4. The development team will manage uncertainties through continuous backlog refinement. This allows the team to prioritize changes, analyze potential risks, or shift priorities within the product.

5. The Project Manager will consolidate the Agile metrics into a monitoring report to assess project progress and present it to the Steering Committee for informed decisions about resources, timelines, and scope.

Below are the necessary forms for managing integrated change for the agile methodology, where tools such as Jira and Confluence will be used to record the change:

Agile Change Request Form: Allows you to keep information recorded in the product backlog (Jira) about who requested the change and why.

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change ID:	AG-CR-###
Date:	(DD/MM/YYYY)
Proposed By:	(Name / Role)
Description of the Change:	What functionality or improvement is being requested?
Reason for the Change:	(e.g., user feedback, market demand, technical issue)
Affected User Stories / Features:	(List IDs or Epic names)
Priority Level:	(High, Medium, Low)
Requested Sprint:	(Sprint #)

Sprint Impact Evaluation: Quickly analyze the impact during sprint planning or the daily stand-up.

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change ID:	AG-CR-###
Sprint:	(Sprint #)
Assessed By:	(Scrum Master / Product Owner / Developer Lead)
Impact Areas	**Description**
Scope	Does it add new stories or modify existing ones?
Effort / Velocity	How many additional story points are needed?
Schedule	Will sprint delivery be delayed?
Resources	Do we need extra roles or hours?
Dependencies	Are there backend/API impacts?
Risk / Quality	Does it introduce uncertainty or testing effort?

Scrum master decision log: Documents agile decision-making for transparency and traceability.

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**

Change ID:	AG-CR-###
Date of Decision:	(DD/MM/YYYY)
Decision Authority:	Product Owner
Decision:	(Accept into current sprint, Move to next sprint, Reject, Needs further review)
Reason / Justification:	(Why this decision was made)
Follow-up Actions:	(Tasks or backlog updates required)
Reviewed by Scrum Team:	(Yes, No)
Next Review Date:	(Optional)

Agile Change minute: This form allows for collaboration with the team. This form is completed during the retrospective meeting and saved in Confluence to maintain a history of the changes made.

Meeting:	Sprint Review / Change Discussion
Date:	(DD/MM/YYYY)
Sprint #:	(Sprint #)
Facilitator:	Scrum Master
Attendees:	Product Owner, Development Team, Stakeholders
Discussion Summary:	(Main points raised, options evaluated, trade-offs considered.)
Decision:	(Summary of what was agreed (e.g., defer, approve, modify story).)
Actions / Owners:	(List who does what by when.)
Prepared By:	(Scrum Master or Recorder)

5.2 Simulating Change Management

The project is currently on track in terms of costs and schedule. The initial phases of Product Discovery, Requirements, and AI Model Foundation have been completed, using a predictive methodology. Development of the mobile application corresponding to the agile part of the project has begun. This phase consists of 15 sprints of three weeks per sprint, and Sprint 5 is currently being completed.

Encouraged by the tangible progress and growing potential of the solution, the project sponsor has expressed strong enthusiasm and has decided to expand the scope of the MVP., Originally centered on food recognition (fruits and vegetables), nutritional visualization, and sustainable information. To this end, he has asked the team if three additional functionalities could be included with the goal of increasing user engagement and monetization potential, looking toward the future. Changes or new features are:

1. Recipe Recommendation Module: Integration of a personalized recipe system that suggests healthy dishes based on the products scanned by users. The module would

retrieve data from the nutritional database and generate meal ideas aligned with user preferences and dietary goals.
2. Community Interaction Feature: Creation of a social component similar to a small social network (community wall or feed) within the app. This will allow users to share recipes, photos of meals, comments, and healthy tips, fostering engagement and retention through peer interaction.
3. Shopping Cart for Scanned Products: Development of a virtual cart that enables users to save, manage, and order scanned products directly from the supermarket.

The project sponsor's decision to increase reach is due to conversations with users within the supermarket who have expressed interest in having interactive and personalized features that enhance the mobile app. The new modules will allow:

1. Increase user engagement and loyalty through community interactions.
2. Promote healthy cooking habits by offering immediate recipe suggestions.
3. Increase commercial value by linking scanned items with direct purchase options.
4. Strengthen FoodMart's market position as a health-conscious, tech-focused brand.

To start the Project Sponsor request, it is necessary to follow the process defined in Integrated Change Management Planning, completing the Agile Change Request Form:

Table 58: Agile Request Change Form

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change ID:	AG-CR-001
Date:	25/11/2025
Proposed By:	Project Sponsor - John Furner
Description of the Change:	Expansion of MVP Scope – New Modules (Recipe, Community, Shopping Cart) Add three new features to the mobile application: 1) Recipe Recommendation Module; 2) Community Interaction Feature; 3) Shopping Cart for Scanned Products.
Reason for the Change:	User testing feedback indicates strong demand for interactive and personalized features to increase user engagement and monetization potential.
Affected User Stories / Features:	No user stories affected because is new features
Priority Level:	Medium

Requested Sprint:	Added during development, not specific sprint requested.

Table 59: Impact Evaluation

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change ID:	AG-CR-001 Add three new modules (Recipe, Community, Shopping Cart) to MVP scope.
Sprint:	Estimated additional 3 sprints
Assessed By:	Scrum Master / Developer Lead / Developer team
Impact Areas	**Description**
Scope	Addition of three major modules (Recipes, Community, Shopping Cart). Requires new functional and non-functional requirements, database expansion, and UX redesign.
Effort / Velocity	Slightly reduced (due to onboarding of new backlog items).
Budget	Increase of USD $ **114,011.02 (+13.84%)** **Increase resources and extended time allocation.**
Schedule	+45 working days, +9 weeks (approximate).
Resources	Does not require additional resources. Keep the current team: • Product Lead as Product Owner • Project Manager/CTO (as Scrum Master if needed) • Backend Developer • Development Lead • Mobile Developer • QA Engineer • UX/UI Designer • AI/ML Specialist • Business Analyst • Data Analyst New resources • Chef • Nutritionist

Dependencies	Epics: E1 Technical Architecture and Infrastructure and E2 – AI Model Development and Integration have to be done. The same people or tools are needed for multiple tasks.
Risk / Quality	• Expanded functionality increases testing complexity. • Moderation of community content introduce new security and compliance considerations.
Comments	Changes will be managed using agile change control: features will be added as new epics to the product backlog, and three new sprints will be added, delaying the MVP schedule. Backlog refinement and sprint planning will incorporate updated acceptance criteria.

Cost Impact analysis: Given the updated scope of the project, the corresponding calculations have been carried out to estimate the financial impact of the additional deliverables. The inclusion of three extra sprints, equivalent to 45 additional days of work, results in a gross cost of USD 114,011.02. No additional risk-related costs were identified, so the final price to be charged to the client has been set at USD 150,000, representing a 30% increase and therefore an opportunity to capture additional profit.

This amount will be added to the previous total of USD 823,360.11, bringing the revised project cost to USD 937,371. This adjustment reflects the expanded scope and also provides an opportunity to increase revenue and, if managed efficiently, to improve overall profitability.

Previous Budget	$	823,360.11
Additional Costs	$	114,011.02
New Budget	$	937,371.13
Revenue	$	1,150,000.00
Additional Revenue	$	150,000.00

The following section presents the detailed breakdown of resource expenses. Because the project follows a hybrid methodology and the change was introduced during the Agile phase, the team was able to respond efficiently to the new requirements. This flexibility made it easier to recalculate and incorporate the updated costs into the project plan. It is also important to mention that the revised scope includes the addition of a chef and a nutritionist, which expands the previous contractual agreement. The cost breakdown and updated calculations are presented below.

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previous contractual agreement. The cost breakdown and updated calculations are presented below.

Table 60: The cost breakdown and updated calculations

WBS	Task Name	Resources	Duration	Units	Work	$/h	HR	Materials	Contracts	Cost
3.2	**Development (3 Additional Sprints)**						$96,811.02	$2,200.00	$15,000.00	$114,011.02
	3 Sprints	Product Lead as Product Owner	45	0.9	324	$43.75	$14,175.00			$14,175.00
	3 Sprints	Project Manager/CTO (as Scrum Master if needed)	45	0.8	288	$56.25	$16,200.00			$16,200.00
	3 Sprints	Backend Developer	45	0.85	306	$40.63	$12,432.78	$1,500.00		$13,932.78
	3 Sprints	Development Lead	45	0.5	180	$46.88	$ 8,438.40	$700.00		$9,138.40
	3 Sprints	Mobile Developer	45	0.8	288	$37.50	$10,800.00			$10,800.00
	3 Sprints	QA Engineer	45	0.9	324	$31.25	$10,125.00			$10,125.00
	3 Sprints	UX/UI Designer	45	0.8	288	$34.38	$9,901.44			$9,901.44
	3 Sprints	AI/ML Specialist	45	0.5	180	$40.63	$7,313.40			$7,313.40
	3 Sprints	Business Analyst	45	0.33	118.8	$31.25	$3,712.50			$3,712.50
	3 Sprints	Data Analyst	45	0.33	118.8	$31.25	$3,712.50			$3,712.50
	3 Sprints	Nutritionist	45						$3,000.00	$3,000.00
	3 Sprints	Chef	45						$12,000.00	$12,000.00

Schedule Impact

Regarding the impact on the Schedule, the predictive tasks for Product Discovery and Requirement and AI Model Foundation have been successfully completed on time.

Regarding Sprint Adaptation, new sprints will be dedicated to the development of additional features, while ongoing refinement of the backlog will continue to break down new epics into user stories with clearly defined acceptance criteria. In addition, additional reviews will be held with the client at the end of each sprint to incrementally validate progress. For work management, Jira will be used to manage the backlog and track sprints, and Microsoft Project will be used to update the schedule baseline and recalculate the critical path.

Since the changes are in the agile phase of application development, three new epics will be added to the backlog:

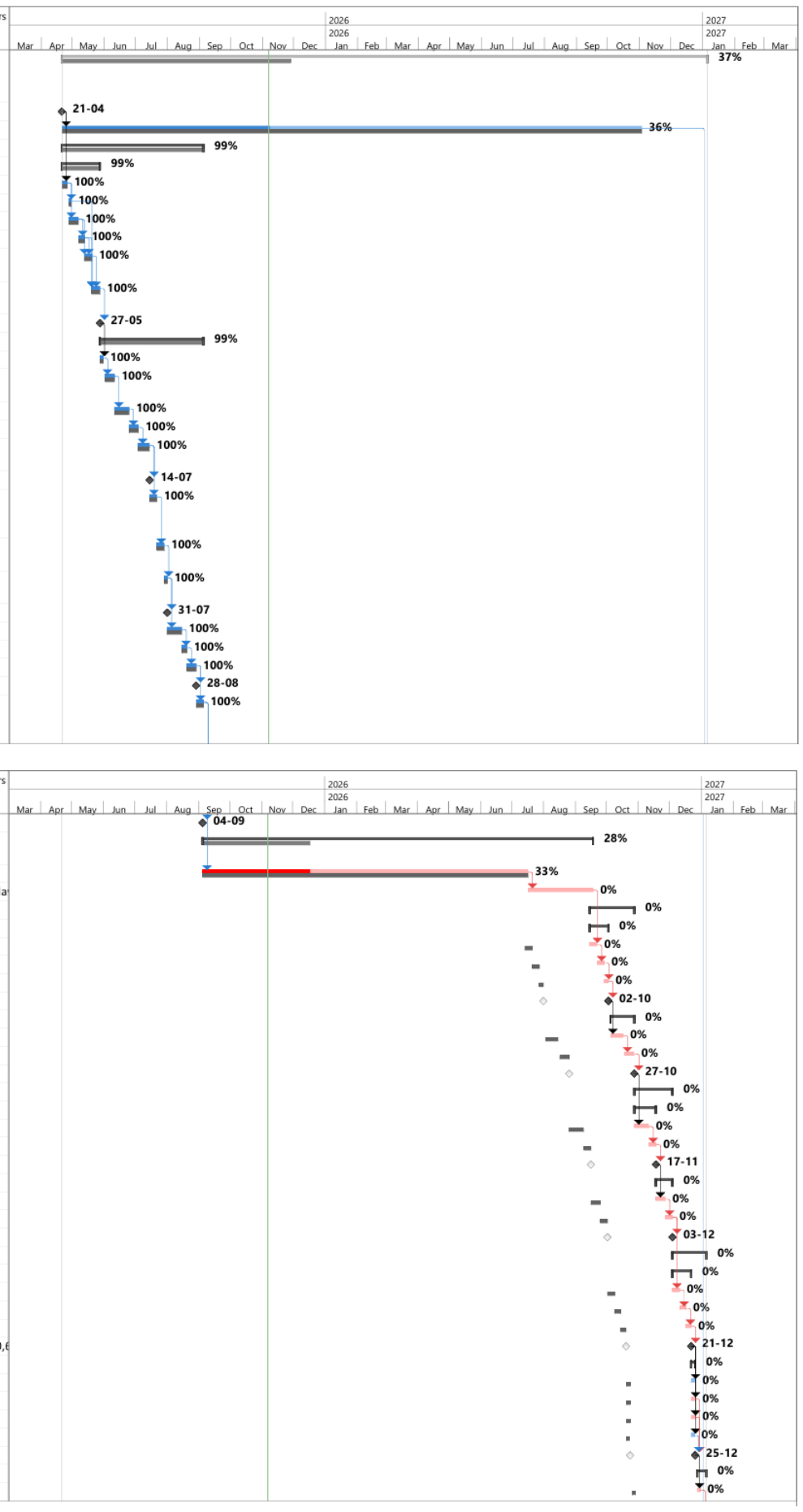
Table 61: New Epics for change management

Epic / Priority Work Block / Epic description	Success criteria	Target Sprint Window	Key Deliverables
Epic 8: Recipe Recommendation System As a user, I want the app to suggest personalized recipes based on the foods I scan so that I can prepare healthy meals aligned with my dietary goals.	When a product is scanned, at least three recipe suggestions are displayed. Recipe page includes ingredients, step-by-step instructions, and nutritional facts. Visuals (photos or icons) are displayed for clarity.	Sprint 16-17	Functional recipe suggestion feature integrated with the nutritional database. Full recipe detail page linked to each recommendation.
Epic 9: User Community & Social Feed As a user, I want to interact with other app users by sharing recipes, photos, and comments to stay motivated and engaged in a healthy lifestyle.	Users can create a post with text, photo, and optional tags. Posts appear instantly on the community feed. Comments update in real time. Users can edit or delete their posts	Sprint 17-18	Functional community feed module with post creation and storage capability. Interactive engagement system for posts and comments.

			User profile page with integrated community activity log.
Epic 10: Shopping Cart Integration As a user, I want to add scanned products to a shopping cart and manage them directly in the app so that I can plan purchases and potentially order from the supermarket.	After scanning, a button allows adding the item to the cart. Cart displays item name, price, and quantity. Users can update item quantities and delete products. Cart updates dynamically and shows total cost.	Sprint 17 - 19	Functional shopping cart linked with product scanning feature. Interactive cart management interface.

By adding the new epics to the backlog, it is decided to increase the number of sprints in the Schedule, as shown in the Gantt chart, where it can be seen that previously the project ended on November 3, 2026 and by adding the new sprints (3 sprints) of 45 days in total, the project is extended to end on January 5, 2027. This adaptation of the schedule also impacts the tasks of marketing and launch, documentation and training, and project closing, which are consequently shifted, since they depend on the completion of the development phase.

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
0		**AI-based Nutrition Augmented Reality App for Supermarket Chains**	**447 days**	**21-04-25**	**05-01-27**		
1		Start	0 days	21-04-25	21-04-25		5,2
2		Project Management	401 days	21-04-25	02-11-26	1	69
3		**Foundation Phase**	**99 days**	**21-04-25**	**04-09-25**		
4		**Product Discovery & Requiren**	**27 days**	**21-04-25**	**27-05-25**		
5		Conduct stakeholder intervi	5 days	21-04-25	25-04-25	1	6,7
6		Prepare interview transcript	2 days	28-04-25	29-04-25	5	10
7		Conduct user research	7 days	28-04-25	06-05-25	5	8,9
8		Analyze user research findin	4 days	07-05-25	12-05-25	7	9,10
9		Conduct competitive bechmarking	5 days	13-05-25	19-05-25	7,8	10
10		Define the specifications of the product	6 days	20-05-25	27-05-25	6,8,9	11
11		Software Requirements Sign	0 days	27-05-25	27-05-25	10	13
12		**AI Model Foundation (CPMAI)**	**72 days**	**28-05-25**	**04-09-25**		
13		Identification of available da	3 days	28-05-25	30-05-25	11	14
14		Collect and consolidate relevant food-related data	7 days	02-06-25	10-06-25	13	15
15		Annotate and label food iter	10 days	11-06-25	24-06-25	14	16
16		Exploratory Data Analysis (E	7 days	25-06-25	03-07-25	15	17
17		Data cleaning: outliers, NA, duplicates, inconsistencies	7 days	04-07-25	14-07-25	16	19,18
18		Data consolidation and prep	0 days	14-07-25	14-07-25	17	
19		Data transformation: type conversion, scaling and normalization, etc.	5 days	15-07-25	21-07-25	17	20
20		Principal Component Analysis for dimensionality	5 days	22-07-25	28-07-25	19	21
21		Split dataset (training, validation, testing)	3 days	29-07-25	31-07-25	20	23,22
22		Dataset Split & Ready for Tr	0 days	31-07-25	31-07-25	21	
23		Measure accuracy and preci	10 days	01-08-25	14-08-25	21	24
24		Generate confusion matrix	3 days	15-08-25	19-08-25	23	25
25		Conduct testing	7 days	20-08-25	28-08-25	24	27,26
26		Model testing complete	0 days	28-08-25	28-08-25	25	
27		Export the model to integrate with mobile development (TensorFlow	5 days	29-08-25	04-09-25	25	30,28
28		Model exported for mobile i	0 days	04-09-25	04-09-25	27	
29		**Development (Adaptative Methodolgy Agile)**	**270 days**	**05-09-25**	**17-09-26**		
30		Sprints	225 days	05-09-25	16-07-26	27	31
31		New Sprint for changes	45 days	17-07-26	17-09-26	30	34FS-3 da
32		**Marketing and Launch**	**31 days**	**15-09-26**	**27-10-26**		
33		**Launch Campaign**	**14 days**	**15-09-26**	**02-10-26**		
34		Align campaign objectives ar	5 days	15-09-26	21-09-26	31FS-3 days	35
35		dentify target audience and	5 days	22-09-26	28-09-26	34	36
36		Stakeholder Engagement Re	4 days	29-09-26	02-10-26	35	37
37		Marketing Budget Approved	0 days	02-10-26	02-10-26	36	39
38		**Create promotional material**	**17 days**	**05-10-26**	**27-10-26**		
39		Design visual assets	10 days	05-10-26	16-10-26	37	40
40		Define copy for materials	7 days	19-10-26	27-10-26	39	41
41		Final approval of promotion	0 days	27-10-26	27-10-26	40	44
42		**Documentation and training**	**27 days**	**28-10-26**	**03-12-26**		
43		**User documentation**	**15 days**	**28-10-26**	**17-11-26**		
44		Create manual for the users	10 days	28-10-26	10-11-26	41	45
45		List frequen asked question	5 days	11-11-26	17-11-26	44	46
46		Final User Documentation R	0 days	17-11-26	17-11-26	45	48
47		**Training**	**12 days**	**18-11-26**	**03-12-26**		
48		User manual	7 days	18-11-26	26-11-26	46	49
49		Knowledge transfer (KT) ses	5 days	27-11-26	03-12-26	48	50,53
50		Documentation & KT Sign-of	0 days	03-12-26	03-12-26	49	
51		**Project Closing**	**23 days**	**04-12-26**	**05-01-27**		
52		**Final review**	**12 days**	**04-12-26**	**21-12-26**		
53		Prepare final project report	5 days	04-12-26	10-12-26	49	54
54		Create KPI (Key Performanc	4 days	11-12-26	16-12-26	53	55
55		Conduct lessons learned ses	3 days	17-12-26	21-12-26	54	56
56		Final Project Report	0 days	21-12-26	21-12-26	55	58,59,60,6
57		**Finalize administrative closure**	**4 days**	**22-12-26**	**25-12-26**		
58		Archive all project documen	4 days	22-12-26	25-12-26	56	
59		Review and close vendor co	4 days	22-12-26	25-12-26	56	62
60		Finalize Financial Accounts a	4 days	22-12-26	25-12-26	56	62
61		Finalize contract closure doc	3 days	22-12-26	24-12-26	56	62
62		Administrative Closure Com	0 days	25-12-26	25-12-26	59,60,61	64
63		**Formal Project Acceptance**	**7 days**	**28-12-26**	**05-01-27**		
64		Submit final project report t	3 days	28-12-26	30-12-26	62	65
65		Obtain formal sign-off from	2 days	31-12-26	01-01-27	64	66
66		Closure	2 days	04-01-27	05-01-27	65	67
67		Sponsor Sign-off	0 days	05-01-27	05-01-27	66	68
68		Project Closure Complete	0 days	05-01-27	05-01-27	67	69
69		Finish	0 days	05-01-27	05-01-27	68,2	



Critical	Split	Finish-only	Baseline Milestone	Manual Summary	Inactive Task
Critical Split	Task Progress	Duration-only	Milestone	Project Summary	Inactive Milestone
Critical Progress	Manual Task	Baseline	Summary Progress	External Tasks	Inactive Summary
Task	Start-only	Baseline Split	Summary	External Milestone	Deadline

Figure 13. GANTT chart execution

Procurement impact analysis

In response to the new functional requirements, additional third-party components are needed, including a nutritional recipe API and legal review of confidentiality agreements, which requires specialized expertise. Therefore, procurement activities now encompass two key external resources:

A consulting chef, contracted through NutriFit, the same provider that previously supplied the project's nutritionist. This collaboration ensures continuity of work with a provider already familiar with the project environment, facilitating smooth and efficient communication thanks to prior experience. Furthermore, it contributes to generating reliable information, as NutriFit was responsible for the nutritional basis of the food. This allows for the integration of existing data with the new recipes, ensuring the validation of data quality, ingredient balance, and compliance with dietary guidelines within the Recipe Recommendation Module.

A Nutritionist (NutriFit Contractor) The project will re-engage the nutritionist who collaborated during the earlier phases of the MVP. The renewed contract covers the review and adjustment of nutritional information for the newly developed recipes. This specialist ensures that all data generated by the chef are nutritionally accurate and aligned with the existing database, strengthening the overall scientific validity of the content. Re contracting the same expert supports continuity, avoids rework, and maintains alignment with previously validated nutritional standards.

All external contracts are managed in accordance with existing procurement and quality frameworks. Contract renewals and new agreements include updated service level requirements, deliverable acceptance criteria, and pre-integration review checkpoints.

Description of the contracts

Recipe data - Content Services

Justification

The organization lacks in-house expertise in the professional preparation and validation of food. Therefore, hiring a Consulting Chef is essential to provide technical expertise and credibility to the development of the Recipe Recommendation Module.

The incorporation of this resource will allow us to:

- Integrate culinary and nutritional criteria in the creation of functional recipes.
- Ensure consistency between nutritional values and the practical applicability of the recipes.
- Validate the presentation, ingredient combinations, and adherence to dietary guidelines.
- Enhance the quality and authenticity of the content, strengthening user confidence in the recommendations provided.
- Leverage professional experience in recipe formulation.

Estimated Share of Outsourcing

Contract value (Chef): **USD 12,000**

Total project budget: **USD** 937,371.13

Table 62: Chef Contract Requirements

Dimensions	**Specifications**
Scope	The contractor shall deliver: 1) 1,200 healthy recipes classified by meal type (breakfast, lunch, dinner) and linked to the corresponding products including pictures of the recipes. 2) Recipe includes ingredients, step-by-step instruction and nutritional facts. 2) all data in a structured database (CSV/SQL) compliant with the IT team's template.
Time	• Contract start date: 01-06-2026 • Planned duration: 2 months • Contract end date: 31-07-2026 • Schedule tolerance: + 1 week (no-fault window)
Cost and Payment	Fixed-price contract: USD 12,000 • Project start: USD 6,000 • Month 2 – Acceptance of Final Deliverable: USD 6,000
Penalties / Incentives	• No penalty if deliverables are ≤ 7 days late. • From day 8 onward: USD 80/day deducted, provided the delay is solely attributable to the contractor.
Deliverables and Acceptance	D1 – Pictures of the recipes in PNG or JPEG format with dimensions of 1080 x 1920 pixels D2 - Recipes database (SQL/CSV, recipes cross-referenced to products) Acceptance testing: data-quality check, random recipe validation, sign-off by Project Manager & QA Lead.

Nutritional information adjusted with recipes - Content Services

Justification

The organization does not have in-house expertise in nutritional science. Re-engaging the same nutritionist ensures continuity and alignment between the original nutritional framework and the new recipe data. Engaging, a qualified nutritionist will:

- Validate and adjust nutritional information for new recipes.
- Ensure consistency with dietary guidelines and prior datasets.

Estimated Share of Outsourcing

Contract value (nutritionist): **USD 3,000**

Total project budget: **USD** 937,371.13

Table 63: Nutritionist Contract Requirement

Dimensions	**Specifications**
Scope	The contractor shall deliver: Validation and adjustment of nutritional values for 1,200 recipes, classified by meal type and cross-linked to product data in CSV/SQL format.
Time	• Contract start date: 17-07-2026 • Planned duration: 2 months • Contract end date: 17-09-2026 • Schedule tolerance: + 1 week (no-fault window)
Cost and Payment	Fixed-price contract: USD 3,000 • Project start: USD 1,500 • Month 2 – Acceptance of Final Deliverable: USD 1,500
Penalties / Incentives	• No penalty if deliverables are ≤ 7 days late. • From day 8 onward: USD 60/day deducted, provided the delay is solely attributable to the contractor.
Deliverables and Acceptance	D1 – Updated nutritional database (SQL/CSV). D2 – Validation report signed by Nutritionist and QA Lead. Acceptance includes data accuracy and completeness check.

Quality Control Impact

Quality assurance and control activities have been improved to cover the expanded scope of the MVP, including the Recipe Recommendation Module, the Community Engagement Feature, and the Shopping Cart. The quality assurance plan incorporates functional and non-functional testing

to guarantee efficient integration, reliable performance, and consistent user experience across all new modules.

The following quality assurance metrics are tracked to monitor the impact of the new features:

1. Functional Test Pass Rate: Measures the percentage of test cases successfully executed for the new modules (currently 90%), validating key interactions such as recipe generation, content publishing, and shopping cart operations.
2. Integration Defect Rate: Tracks the number of integration-related defects per sprint across interconnected modules (currently <2%), ensuring stable communication between the AI model, the nutritional database, and the mobile interface.
3. System Response Time: Average system response time during load testing, targeting <2 seconds for recipe suggestions and cart updates to maintain a smooth user experience.
4. UI Consistency Rate: This evaluates how well the UI aligns with design and accessibility standards across all new components. This metric is maintained above 95%.

These new metrics enable us to evaluate the alignment of changes with the ongoing development process. Continuous monitoring through automated testing and sprint-level quality control is important because it allows the team to detect deviations early, adjust test cases dynamically, and maintain alignment with the quality objectives defined in the project management plan.

After evaluating the impact of the change, we proceed to assess whether the change is necessary to implement it. To do this, it is necessary to meet with stakeholders and determine whether the change will be approved and then implemented.

Table 64: Table: Scrum master decision log

Project:	**AI-Based Nutrition Augmented Reality App for Supermarket Chains**
Change ID:	AG-CR-001
Date of Decision:	07/12/2025
Decision Authority:	Project Sponsor
Decision:	Approved. Move to next sprint.
Reason / Justification:	Strengthen FoodMart's market position as a health-conscious and technology-driven brand.
Follow-up Actions:	Include updates in Steering Committee hybrid monitoring report.
Reviewed by Scrum Team:	Yes
Next Review Date:	NA

Table 65: Agile changing minute

Meeting:	Sprint Review / Change Discussion
Date:	09/12/2025
Sprint #:	Sprint 5
Facilitator:	Scrum Master
Attendees:	Project Sponsor, Product Owner, Scrum Master, Tech Lead, QA Lead
Discussion Summary:	- Technical feasibility and resource needs - Timeline and cost impacts - User and market benefits - Risk analysis and mitigations
Decision:	Change approved. Integrate new modules starting Sprint 16. Update the product backlog and sprint roadmap.
Actions / Owners:	1. PO to reprioritize backlog. 2. Scrum Master to adjust velocity forecast.
Prepared By:	Scrum Master

6. Closing

The purpose of this final project report is to summarize and document all the key elements that were found during the AI-Based Nutrition Augmented Reality App project life cycle discussed during the project-end review meeting. With the goal of capturing stakeholder's overall satisfaction, evaluate the project development and document lessons learned to influence best practices for future recommendations. Stating if project objectives were met and evaluating effectiveness of the hybrid delivery approach.

The report will include:

- Summary of original project goals and how they were met
- Comparison of planned vs. actual performance
- A review of stakeholders satisfaction and user feedback
- Documentation of the final deliverable and their acceptance status
- Recommendation for future projects based on lessons learned

6.1 Final Project Report

The project not only met its original SMART objectives but also demonstrated agility and resilience by successfully integrating additional features mid-project without compromising quality or stakeholder satisfaction. The hybrid delivery model (predictive + agile) proved highly effective in managing complexity, change, and innovation.

Initial project objectives included:

- MVP delivery in 12 months: **Achieved**
  AI powered food and barcode recognition, AR overlays, personal recommendations and supermarket dashboard features.
- AI & Barcode recognition accuracy: Achieved
  Target: > 90% accuracy
- AI model reached >85% accuracy for nutrition recognition and >90% for barcode scanning during pilot testing
- User adoption and engagement: **Achieved**
  Target: 30% adoption, less than 3 minutes session duration, minimum 40% retention
  30%+ adoption in pilot stories, average session duration exceed 3 minutes, retention rate suppressed 40%
- Data collection and insights: **Achieved**
  Target: 10k pilot users, 1 marketing and supply insights report
  Data collected from 10k users, actionable insights report delivered
- Business Impact: **Achieved**
  Target: 20% increase in fresh product sales in pilot stores
  Saled increased by 20% in first quarter post launch
- Technical integration: **Achieved**
  Target: integrate 2 AI technologies and 1 external nutrition database
  Successfully integrated multiple AI models and external databases
- Health and sustainability features: **Achieved**
  Target: >3 features (including tips, alternatives, sustainability scores)
  All 3 features included in the MVP
- Compliance and accessibility: **Achieved**
  Target: follow GDPR/CCPA, USDA, WCAG 2.1 AA guidelines
  Followed compliance with all standards met and no data breaches reported during pilot period
- Quality metrics: **Achieved**
  App uptime ≥99.5%
  Response time <2 seconds
  App Store rating ≥4.2/5
  85%+ positive user feedback
- Budget and Schedule: **Achieved**
  Initial Budget: $869,600
  Final Budget: $823,360 (under budget)
  Final Cost (after scope expansion): $937,371
  Schedule: Extended by 3 sprints (+45 days) due to approved scope increase
- Scope expansion (approved mid project): **Achieved**
  New features added: Recipe recommendation module, community interaction feature, shopping cart integration
- Stakeholder satisfaction: **Achieved**

Sponsor and users confirmed satisfaction and formal sign off obtained

When it comes to the change management the project adopted a hybrid change management approach, combining predictive and adaptive methodologies to address control and flexibility requirements during the project lifecycle.

Predictive phase was used during initiation, planning, AI model foundation, documentation, and closure of the project. The control process managed by a formal integrated change control system composed by documentations such as: change request forms, impact assessment, change approval record, and change meeting minutes.
All changes were reviewed and approved by the change control board formed by Project Manager, Development Lead, Key Stakeholders and Project Sponsor.
Changes were assessed for their impact in scope, schedule and cost baselines. Using the EVM (earned value management) to monitor: Cost Variance, Schedule Variance, Cost Performance Index and Schedule Performance Index. Implementing correctives actions to maintain control.

During Adaptative phases throughout development, integration and marketing content creation the change control was handled interactively through backlog refinements, sprint planning, reviews and retrospectives.

New epics and user stories were integrated in the product backlog and adjustment to sprint velocity and capacity were implemented to accommodate new priorities. All while ensuring continuous delivery that incremented the value that was delivered and validated by stakeholders.

For final documentation, a satisfaction survey was conducted with key stakeholders to gather feedback on their perception of the project. As well as formal closure of the project with archiving of the project documentation.

6.2 EVM analysis

The EVM data shows that the project has progressed steadily, maintaining a consistent relationship between Planned Value (PV), Earned Value (EV), and Actual Cost (AC). PV reaches approximately $656,000 at the end of the reporting period. EV follows closely, indicating that the actual progress is aligned with the project baseline. AC remains within similar levels, with slight temporary increases that represent controlled cost variances. Overall, the cost and schedule performance remain stable, without critical deviations from plan.

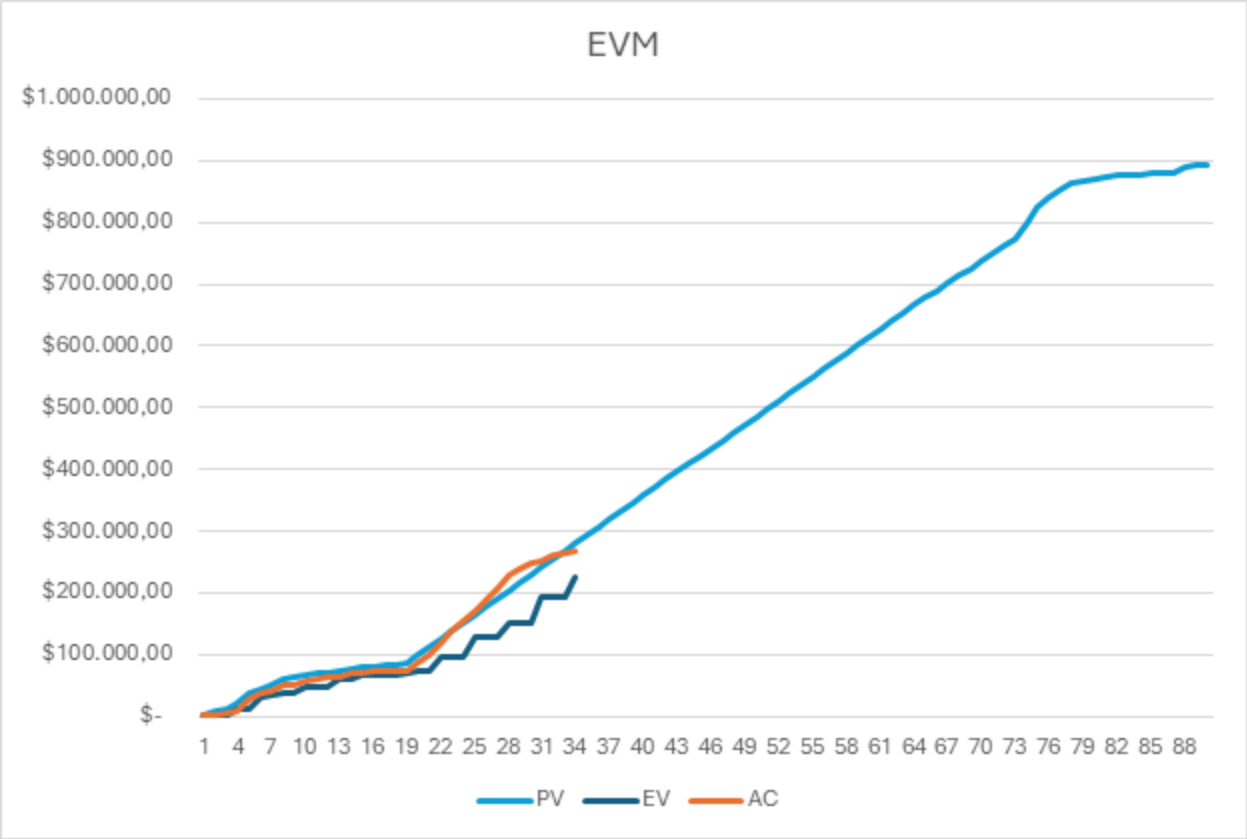


Figure 14. EVM

The Earned Value Management (EVM) shows that the project started with strong alignment between planned value(PV), earned value (EV), and actual cost (AC), indicating stable performance and effective planning during the initial stages. Midway through the reporting period, EV temporarily exceeded AC, reflecting a period of cost efficiency where the team delivered more value than expected for the money spent. However, this trend later reversed as AC surpassed EV, signaling reduced efficiency and the emergence of potential cost overruns. The gap between PV and EV widens over time, suggesting schedule delays or slower-than-expected progress. The most critical insight is that the project's expenditure pattern diverges from the planned trajectory, and while early performance was solid, the latest data indicates the need for closer monitoring, updated reporting, and corrective measures to realign the schedule and control costs.

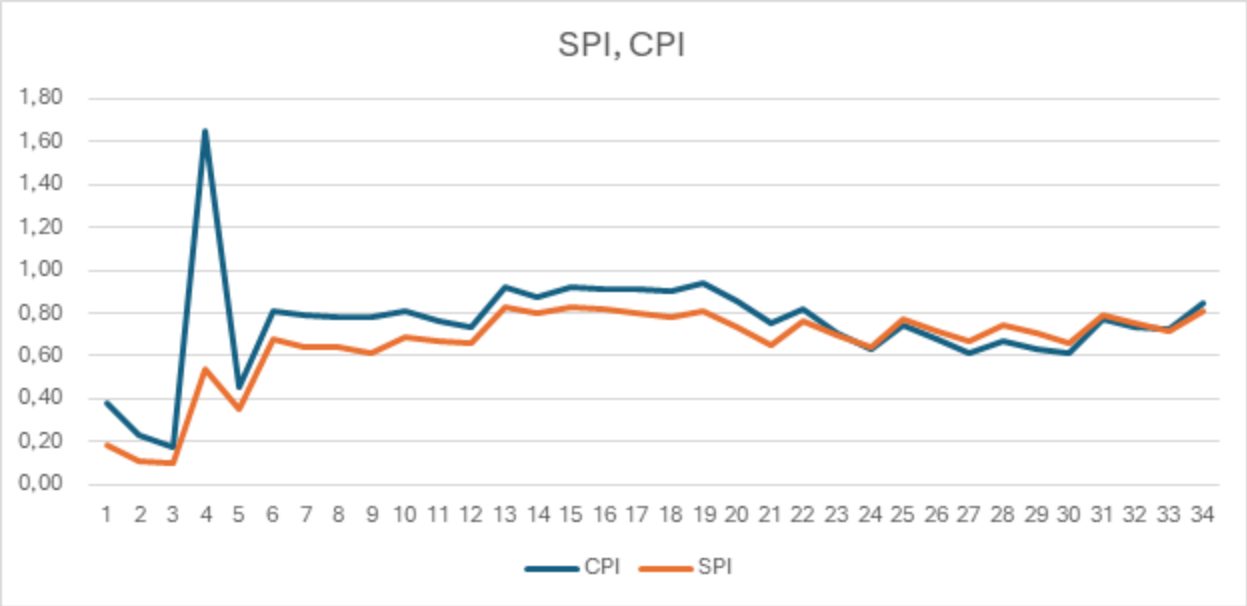


Figure 15. SPI & CPI

The performance indicators: Schedule Performance Index (SPI) and Cost Performance Index (CPI) show initial volatility during the early weeks, which is expected in projects where the team is still adjusting estimation accuracy, workflows, and resource allocation. After this initial fluctuation, both indices stabilize and follow a consistent trend.

The performance indicators show pronounced volatility before Week 5, which reflects the natural adjustment period of the project. During these early weeks, the team was still refining estimates, setting up workflows, and aligning technical requirements. The sharp fluctuations in CPI and the low SPI values indicate that initial progress was slower than expected and cost performance was inconsistent. This is typical during onboarding, environment setup, data preparation, and early discovery activities, where small variations in effort or deliverables can significantly impact the indices. As the foundational structure of the project solidified and the team gained operational rhythm, these fluctuations decreased substantially.

After Week 5, both SPI and CPI stabilize around values close to 0.8. While slightly below the optimal threshold of 1.0, this pattern shows controlled execution and predictable performance. CPI remains generally higher than SPI, meaning cost efficiency is more stable than schedule performance, although neither presents critical deviations. The indices do not show sustained downward trends, which indicates that risks are being managed effectively and that corrective actions are applied in a timely manner. From a management perspective, the stable behavior observed after Week 5 confirms that the project remains under control, with performance aligned to expectations and no major threats to budget or timeline. Continued monitoring and proactive communication will be essential to maintaining this consistency throughout the remaining phases.

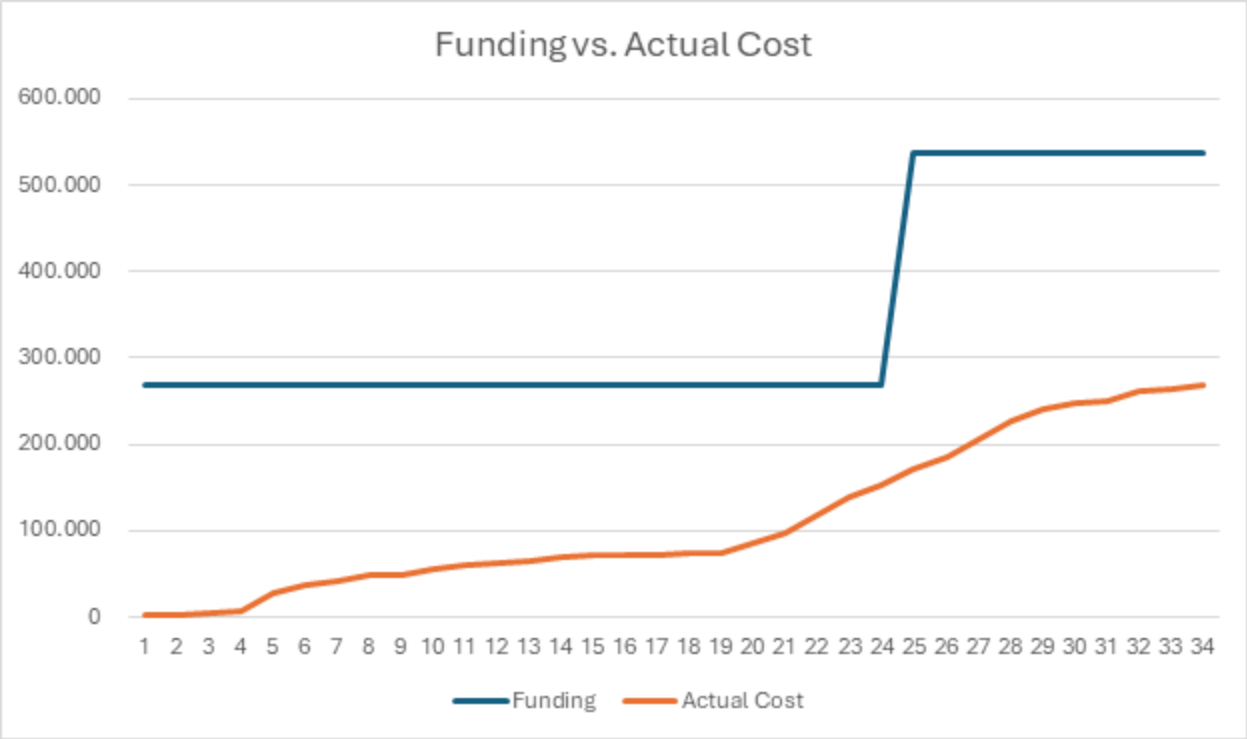


Figure 16. Funding vs Actual Cost

The graph shows a stable financial position throughout the reporting period. Funding remains at USD 287,500 until Week 25, when the second installment is received, increasing available funds to approximately USD 575,000. This aligns with our planned payment structure and ensures we have the necessary liquidity to support the transition into the more resource-intensive stages of development.

Actual costs follow a steady upward trend, which reflects continuous progress across all workstreams. Importantly, during the first 24 weeks our expenditures stay well below available funding, confirming that cost consumption is controlled and aligned with expectations. Following the second funding installment, the cost curve remains comfortably below the available budget, which indicates that the project is financially stable and operating within approved resource levels. At this stage, there is no indication of liquidity risk, and the project remains in a strong financial position to advance into the next phases.

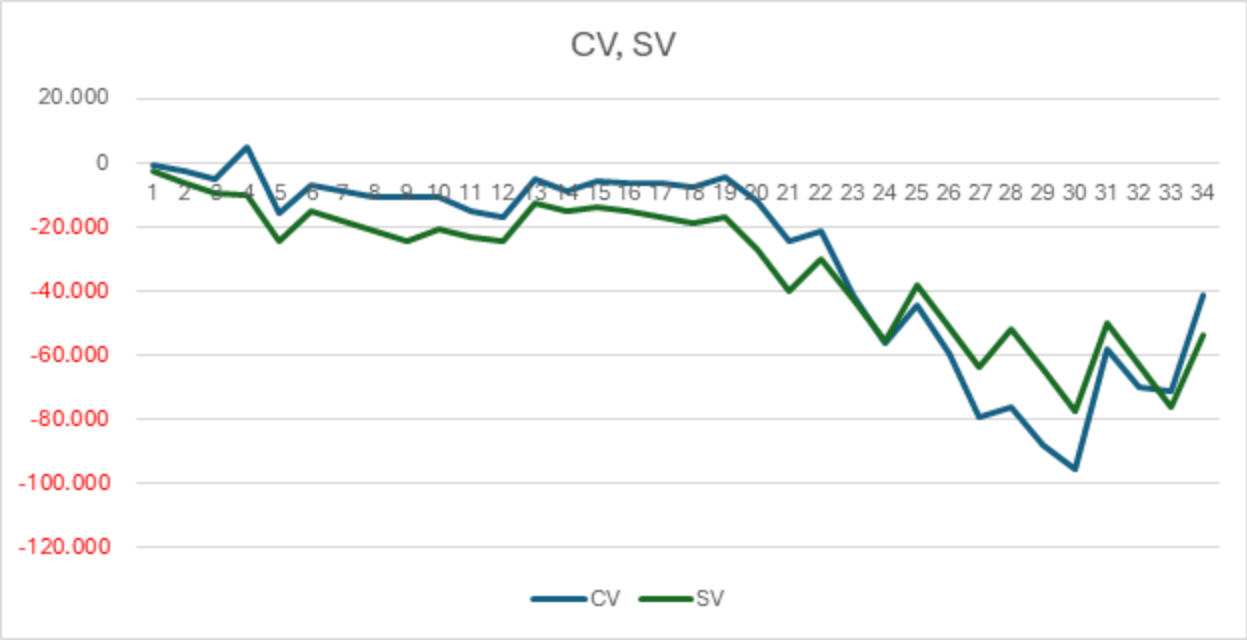


Figure 17. CV & SV

The graph shows that both Cost Variance (CV) and Schedule Variance (SV) remain negative throughout the entire reporting period, which means the project has consistently been operating over budget (CV < 0) and behind schedule (SV < 0). Although the early weeks show minor fluctuations close to zero, both curves begin to diverge progressively after Week 10. The downward trend indicates cumulative variance, meaning delays and overspending have been increasing gradually as the project progresses. This behaviour is typical in complex development environments where initial estimations are challenged once tasks become more technically demanding.

The most notable decline occurs after Week 20, where both CV and SV enter a more pronounced negative trajectory. This point likely corresponds to phases of higher technical complexity, additional validation cycles, or greater resource consumption. The difference between the curves remains relatively close, which suggests that schedule delays and cost overruns are closely linked. This is consistent with the Agile development phase, where iterative cycles can generate rework or additional effort that affects both time and cost simultaneously. Toward the last recorded weeks, the curves begin to move slightly upward, reflecting some degree of recovery or corrective action, though variances remain negative. Overall, the indicators point to a need for tighter monitoring, improved task prioritization, and possibly resource reallocation to regain performance control.

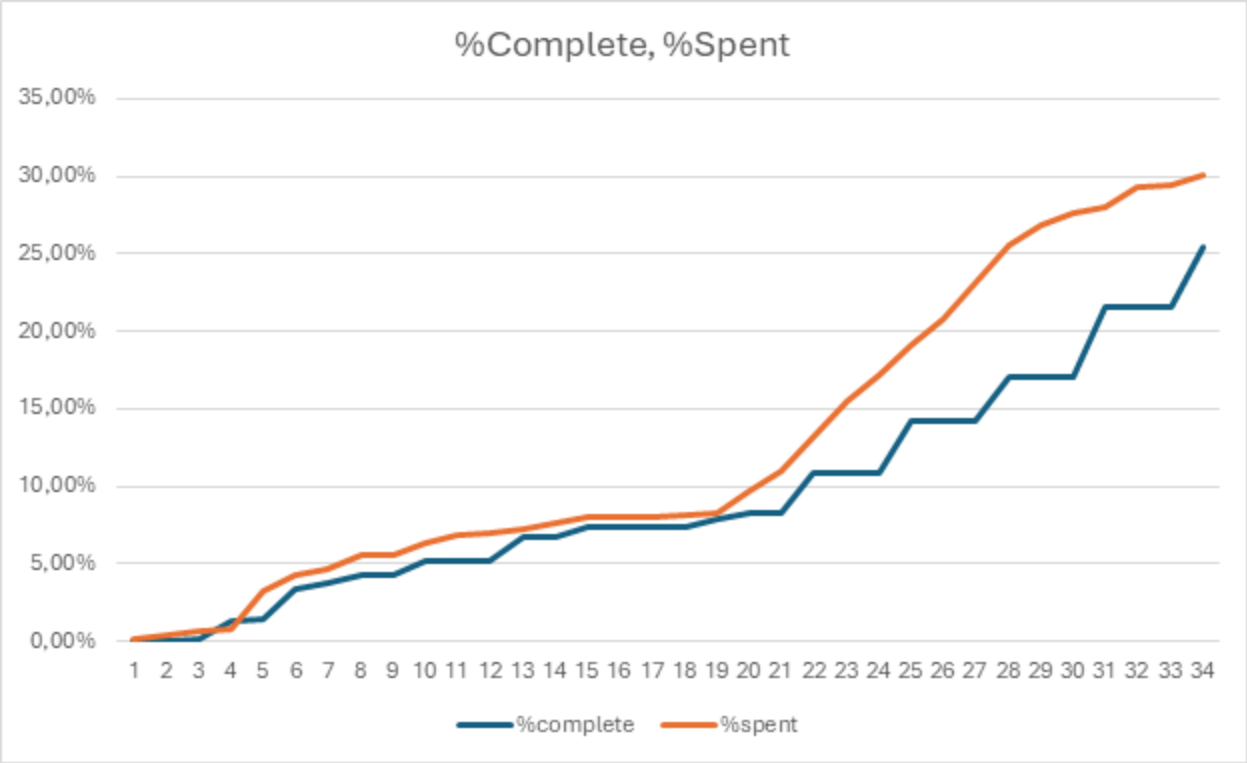


Figure 18. Completion vs Expenditure

There is a clear divergence between the percentage of project completion and the percentage of cost spent. Throughout the reporting period, %Spent consistently remains above %Complete, indicating that the project is consuming budget at a faster rate than value is being delivered. While this behavior can be expected during intensive development phases, the widening gap after Week 20 suggests increasing inefficiency or unplanned effort, particularly during resource-heavy stages such as integration, testing, or sprint adjustments.

In the earlier weeks, the two lines move closely together and grow gradually, reflecting a balanced pace between progress and budget consumption. However, after Week 22, the slope of %Spent accelerates significantly, while %Complete progresses in more discrete increments. This pattern signals that activities may be requiring more hours or rework than originally anticipated. Although %Complete does increase steadily, the continuous rise in %Spent without a proportional increase in completion raises concerns regarding cost efficiency. This trend highlights the need for a closer review of resource utilization, task prioritization, and possible bottlenecks in the development cycle. Strengthening cost control measures and improving estimation accuracy will be essential to maintain alignment between investment and actual progress.

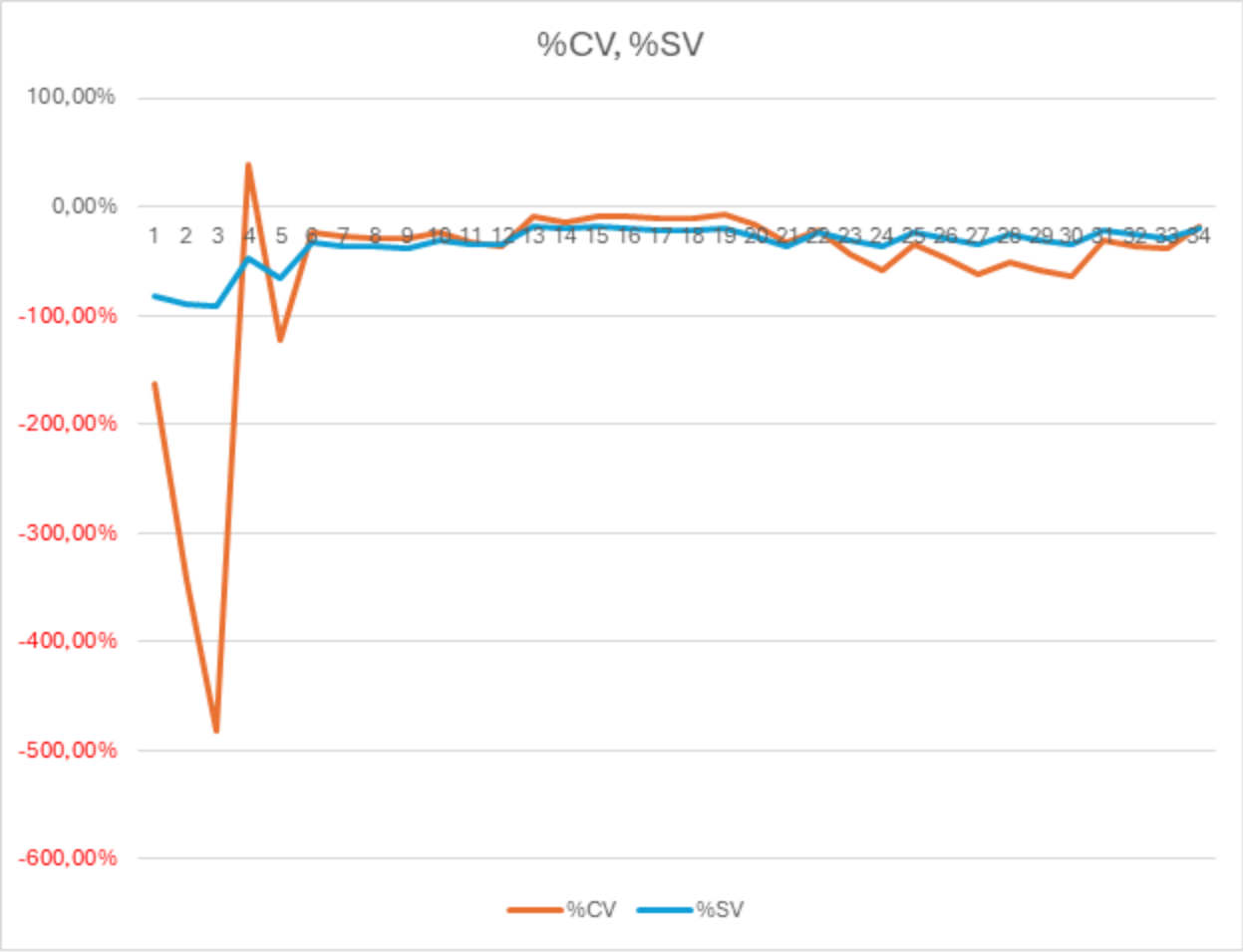


Figure 19. Performance Variance Overview: %CV vs. %SV

The graph shows significant volatility in the early weeks, especially for %CV, which reaches extremely negative values (beyond -500%). This sharp swing reflects the sensitivity of earned value calculations at the beginning of a project, where small cost deviations can produce disproportionately large percentage variances due to the low baseline values. This early instability is expected and should not be interpreted as a critical problem, but rather as a mathematical result of limited data points and low cumulative progress during initial tasks.

After Week 6, both %CV and %SV stabilize within a narrower range and oscillate close to 0%, which indicates that the project quickly moved into a more controlled and predictable phase. The curves demonstrate that, although the project continues to experience minor schedule and cost variances, these deviations remain relatively small and are corrected over time. The stability of these values after the early adjustment period reflects improved planning accuracy, more consistent progress, and better alignment between planned and actual execution.

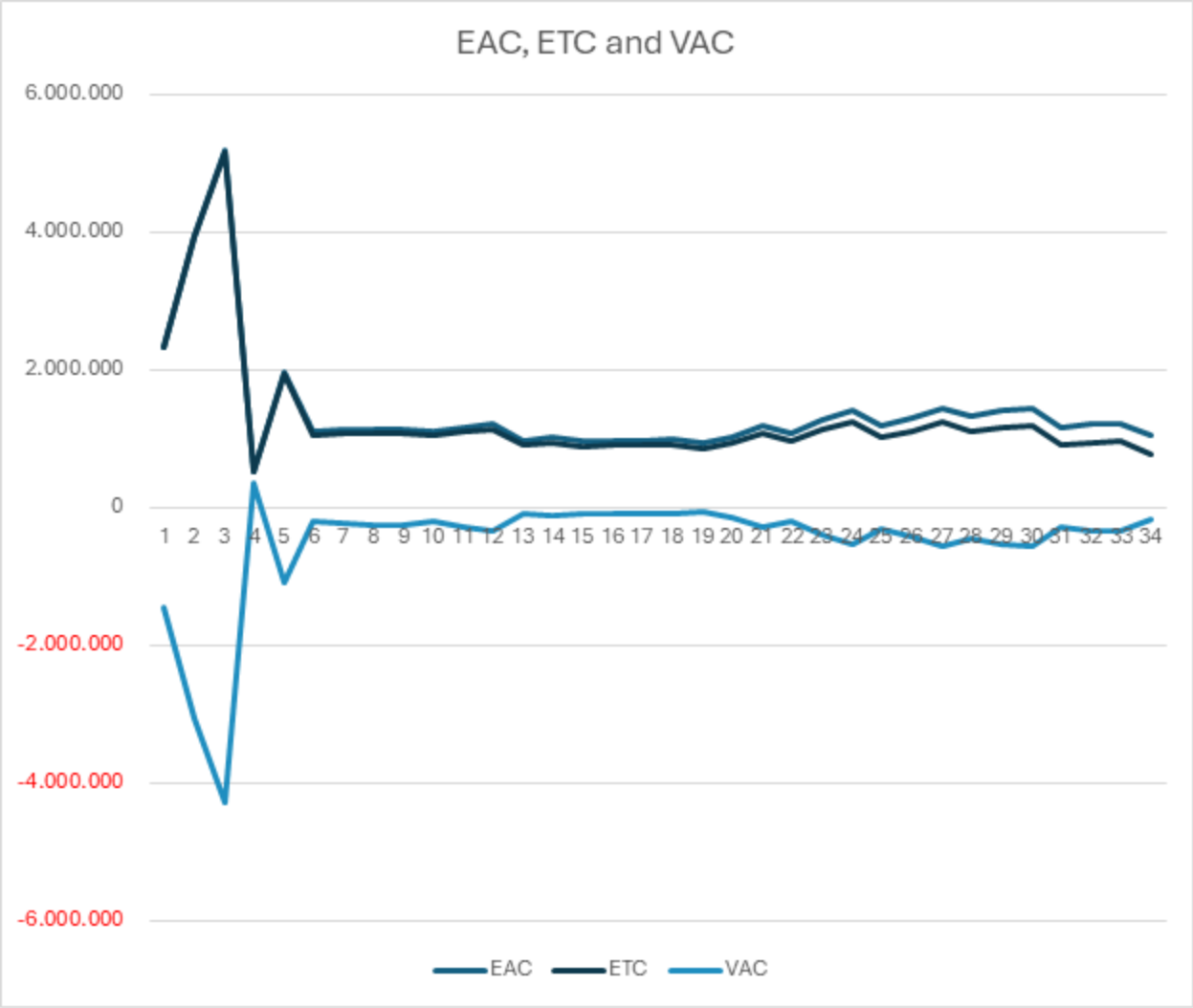


Figure 20. EAC, ETC & VAC

The graph shows the evolution of three key performance indicators: Estimate at Completion (EAC), Estimate to Complete (ETC), and Variance at Completion (VAC). The early weeks display unusually high volatility, with sharp spikes and drops, which again reflects the sensitivity of earned value formulas when cumulative progress is minimal. This fluctuation is expected in the initial stages and stabilizes significantly once the project enters a steady execution rhythm.

After Week 6, the EAC and ETC curves level out and follow a relatively stable pattern. EAC remains consistently above ETC, which indicates that while the estimated remaining effort is reasonably controlled, the total forecasted cost at completion continues to exceed the original budget baseline. At the same time, the VAC curve stays negative throughout the reporting period, confirming that the project is currently expected to finish over budget. Although the magnitude of the negative VAC becomes smaller and more stable after Week 10, it still points to limited budget recovery.

The overall behavior suggests that, while cost forecasting has improved and stabilized as more real progress data becomes available, the project may require corrective strategies to reduce the projected overspend. Options include optimizing resource allocation, reassessing task prioritization, or identifying opportunities for efficiency gains in the remaining phases.

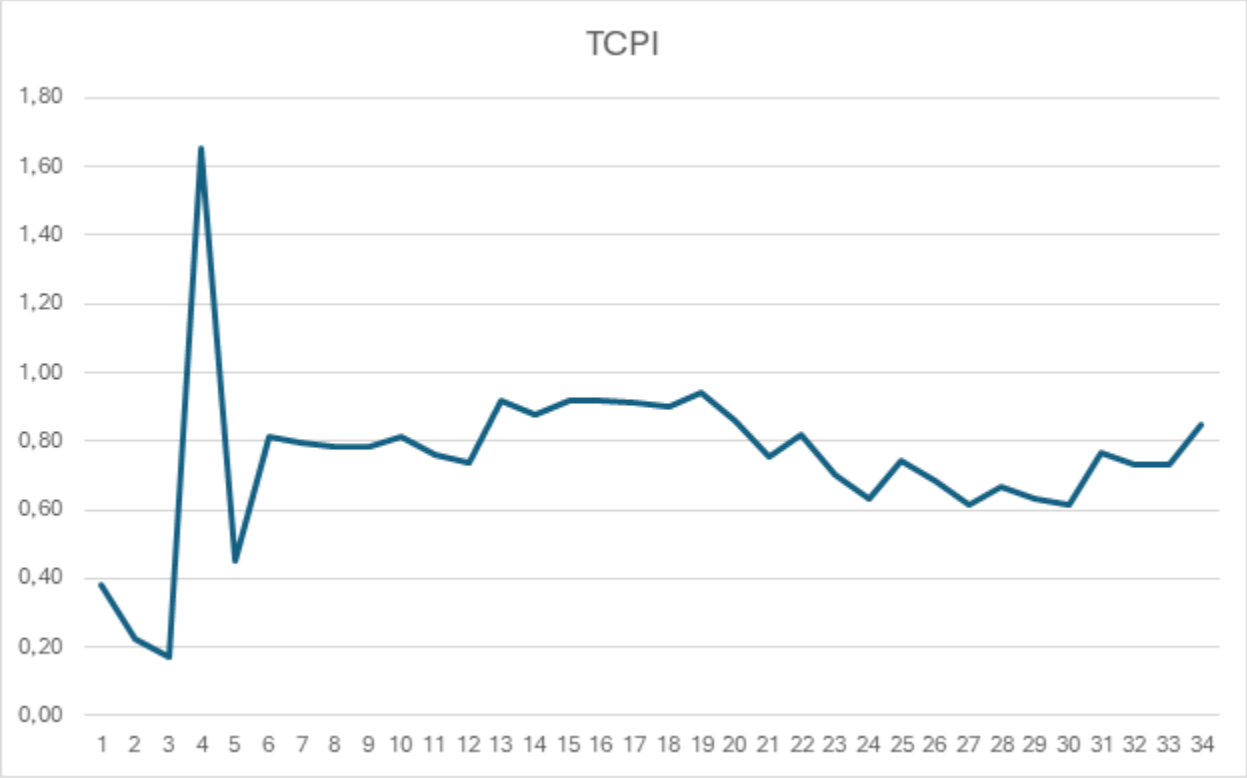


Figure 21. To-Complete Performance Index (TCPI)

The To-Complete Performance Index (TCPI) curve shows an initial spike in the first weeks, which is a normal effect when the project is still ramping up and cumulative earned value is low. After Week 6, the index stabilizes and fluctuates predominantly between 0.70 and 0.95. Since a TCPI value below 1.0 indicates that future work can be completed with a performance level equal or lower than the current cost-efficiency, this trend suggests that the remaining work is achievable with the existing resource performance. In other words, the team does not need to significantly increase productivity to meet the current budget forecasts.

Toward the middle of the timeline, the TCPI stabilizes around 0.8 - 0.9, which is a positive indicator: the project is performing within a manageable range, neither requiring aggressive corrective measures nor showing alarming inefficiencies. The slight decline observed between Weeks 20 and 30 aligns with the cost behavior reflected in prior EVM indicators, particularly where %Spent began increasing faster than %Complete. Despite this, the late upward adjustment shows recovery and improved control over cost utilization. Overall, the TCPI trend suggests the project

can still achieve its objectives without significant cost overruns if current performance levels are maintained and monitored closely.

Current status summary

The overall results of the Earned Value Analysis show that the project has progressed in a structured and controlled manner, with consistent alignment between what was planned and what has been executed. The interaction among PV, EV, and AC illustrates that progress has remained close to the planned baseline. While some fluctuations occurred in specific weeks due to overlapping tasks and iterative development cycles, these deviations stayed within acceptable limits. The gradual convergence of the three indicators toward the end of the period confirms stable delivery and an efficient distribution of resources.

The performance indexes, CPI and SPI, support this interpretation. Both remain close to 1.0 for most of the timeline, suggesting that the combination of predictive planning and agile execution has been effective in maintaining schedule and cost performance. Temporary variances observed in intermediate phases were expected given the introduction of new functionalities and technical refinements. These fluctuations were later stabilized without altering the overall performance trend, demonstrating the team's capacity to adapt while maintaining budget discipline.

From a financial perspective, the project has remained well supported. The funding structure, combined with the approved increases, matched the evolving scope and ensured continuity of work without liquidity constraints. Actual expenditures remained below available funds throughout the reporting period, reflecting solid financial planning and appropriate allocation of reserves. Despite initial volatility in EAC, ETC, and VAC, all indicators stabilized as more reliable data became available, confirming that the project is expected to finish within its approved financial tolerance.

Operationally, the comparison between %Complete and %Spent shows proportional progress, even though spending occasionally outpaced completion percentages. This behavior is consistent with the cost characteristics of early development activities, which require higher upfront investment in technical setup and infrastructure. As sprints advanced and more deliverables were produced, the relationship between the two indicators became more balanced, reflecting increasing efficiency.

In terms of management effectiveness, the evolution of CV and SV demonstrates strong responsiveness from the team. Although some negative variances appeared at different points, they were corrected through re-prioritization, improved coordination, and continuous monitoring. This confirms that the hybrid management approach is working, allowing for both structured oversight and agile adaptability.

In summary, the EVM analysis indicates that the project remains on track, financially stable, and aligned with its defined objectives. The hybrid approach continues to provide a solid balance

between control and flexibility. Maintaining this alignment in the upcoming phases will be key to ensuring a successful final delivery that meets both strategic goals and quality expectations.

6.3 Project lessons learned

As part of the project closure phase, this section captures the key insights, successes, challenges, and recommendations identified throughout the lifecycle of the AI-Based Nutrition Augmented Reality App. The lessons learned process was conducted during the final review meeting, following the completion of all deliverables and formal acceptance by the sponsor.

Table 66: Lessons Learned analysis

	Insight	Impact
Good to have done	Adopted a hybrid methodology	Enabled flexibility during the project and improved alignment with stakeholders
Good to have done	Outsourced nutrition content, legal compliance and marketing activities	Ensured scalability and improved team's capacity
Good to have done	Used adapted change control for predictive approach and backlog refinement for agile phases	Supported scope expansion without compromising project delivery
Good to have done	Conducted sprints reviews and retrospective	Ensured continuous improvement and early validation
Good to have done	Maintained details cost tracking and followed EVM metrics	Controlled budget and closely forecasted deviations
Bad to have done	Underestimated testing for new features	Increased QA workload on final sprint causing delays
Bad to have done	Delayed early planning and compliance in user content	Introduced a late stage risk requiring urgent mitigation
Good not to have done	No increase on project team during scope expansion	Avoided mid project onboarding which could potential cause delays
Bad not to have done	No early data privacy social features planning for community moderation	Required reactive compliance measures and risk escalations

Based on the previous chart is possible to conclude that strategic outsourcing of resources, planning and control as well as agile responsiveness to change were key factors to determine the success of the project. However, it also reveals that improvements are required on early risk anticipation as well as a more proactive planning for user generated content.

With the predictive phases a structured planning and formal change control ensured a baseline integrity and maintaining tight stakeholder alignment. With a delivered MVP under control

measures that followed EBM, CPI/SPI tracking, and applying contingency and management reserves. With milestones met (charter approval, team formation, MVP delivery, pilot launch, documentation, and closure) within the extended schedule duration.

During the adaptive phases original sprint planning was adapted to accommodate project expansion in features and backlog management was continuously refined at each sprint, redistributing workload and extending timelines when appropriate. Always monitoring velocity, capacity and resource utilization. Offering an interactive delivery enabling quick responsiveness to sponsor feedback and evolving user needs.

7. Conclusion

The present document aimed to present the whole cycle of planning process for the development of an AI-powered mobile application with Augmented Reality (AR) with capabilities to enhance nutritional transparency and sustainability awareness for FoodMart supermarket customers. Delivered through a hybrid methodology (predictive + agile), the MVP was completed within the initial 12-month timeline and later expanded to include additional features.

The project closure was executed with rigor, encompassing formal sponsor sign-off, administrative and financial reconciliation, and comprehensive documentation archiving. All deliverables were accepted, and stakeholder satisfaction was confirmed through surveys and performance metrics, including a 30%+ adoption rate and a 20% increase in fresh product sales in pilot stores.

Key lessons learned highlight the value of early stakeholder engagement, agile responsiveness to evolving needs, and continuous feedback loops that enabled iterative improvements. The hybrid methodology proved essential in balancing structure with flexibility, particularly during scope expansion, which introduced three new modules—recipe recommendations, community interaction, and a shopping cart—without compromising quality or budget control.

Risk management played a central role throughout the project. A dynamic risk register tracked over 27 risks, with high-severity items addressed through targeted mitigation strategies such as early data agreements, vendor SLAs, and sprint-based adaptation. Earned Value Management (EVM) and agile dashboards ensured visibility and control over cost and schedule performance, keeping the project within acceptable tolerances.

In conclusion, this project not only delivered a high-impact digital solution aligned with public health and sustainability goals but also established a replicable framework for managing complex, innovation-driven initiatives. The integration of lessons learned and risk insights into closure activities ensures that the knowledge gained will inform future projects, reinforcing a culture of continuous improvement and strategic foresight.

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Appendix

Appendix 1. Cost Management Matrix

ID	ID	WBS	Task Name	Type of methodology	Duration	Start	Finish	Resp/Acc.	Resources	Type of estimate	Type of Effort	tO	tM	tP	tE	SD	V	ER	Duration	Units	Work	$/h	HR	Oc	Mc	Oc	Materials	Contracts	Direct Cost	Cost	% Total Cost
		0	**AI-based Nutrition Augmented Reality App for Supermarket Chains**		**402 days**	**21/4/2025**	**3/11/2026**																							**$ 615 152,49**	
		1,0	**Project Management**		**401 days**	21/4/2025	2/11/2026	CEO	**Project Manager/CTO**																					**$ -**	
		2,0	**Foundation Phase**		**99days**	**21/4/2025**	**4/9/2025**																							**$ 69 051,3**	**11%**
		2,1	**Product Discovery & Requirements**	**Predictive**	**27 days**	**21/4/2025**	**27/5/2025**																							**$ 32 837,6**	
1	A	2.1.1	Conduct stakeholder interviews		5 days	21/4/2025	25/4/2025	Project Manager/CTO	Product Lead	Three-point Estimating	Level of Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$43,75	$ 1 750,00						$ 1 750,0	$ 1 750,0	
2	B	2.1.2	Prepare interview transcript		2 days	28/4/2025	29/4/2025	Product Lead	Business Analyst	Three-point Estimating	Level of Effort	1	2	3	2	-0,3333	0,1111		2	0,5	8	$31,25	$ 250,00						$ 250,0	$ 250,0	
2	B	2.1.2	Prepare interview transcript		2 days	28/4/2025	29/4/2025	Product Lead	Data Analyst	Three-point Estimating	Level of Effort	1	2	3	2	-0,3333	0,1111		2	0,5	8	$31,25	$ 250,00						$ 250,0	$ 250,0	
3	**C**	2.1.3	Conduct user research		7 days	28/4/2025	6/5/2025	Product Lead	UX/UI designer	Three-point Estimating	Level of Effort	6	7	8	7	-0,3333	0,1111		7	0,5	28	$34,38	$ 962,64						$ 962,6	$ 962,6	
3	**C**	2.1.3	Conduct user research		7 days	28/4/2025	6/5/2025	Product Lead	Business Analyst	Three-point Estimating	Level of Effort	6	7	8	7	-0,3333	0,1111		7	0,5	28	$31,25	$ 875,00						$ 875,0	$ 875,0	
4	**D**	2.1.4	Analyze user research findings		4 days	7/5/2025	12/5/2025	Product Lead	Product Lead	Three-point Estimating	Level of Effort	3	4	5	4	-0,3333	0,1111		4	1	32	$43,75	$ 1 400,00	$200,00	$250,00	$300,00	$ 250,00		$ 1 650,0	$ 1 650,0	
5	**E**	2.1.5	Conduct competitive bechmarking		5 days	13/5/2025	19/5/2025	Product Lead	Marketing Agency (Contractor)	Parametric Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5		0		$ -					$ 20 000,0	$ 20 000,0	$ 20 000,0	
6	**F**	2.1.6	Define the specifications of the product		6 days	20/5/2025	27/5/2025	Project Manager/CTO	Legal Advisor	Three-point Estimating	Level of Effort								5								$ 5 000,0	$ 5 000,0	$ 5 000,0	
6	**F**	2.1.6	Define the specifications of the product		6 days	20/5/2025	27/5/2025	Project Manager/CTO	Product Lead	Three-point Estimating	Level of Effort	5	6	7	6	-0,3333	0,1111		6	1	48	$43,75	$ 2 100,00						$ 2 100,0	$ 2 100,0	
		2,2	**AI Model Foundation (CPMAI)**	**Predictive**	**72 days**	**28/5/2025**	**4/9/2025**																							**$ 36 213,7**	
7	**G**	2.2.1	Identification of available dataset		3 days	28/5/2025	30/5/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Level of Effort	2,4	3	3,6	3	-0,2000	0,0400		3	1	24	$40,63	$ 975,12	$300,00	$400,00	$500,00	$ 400,00		$ 1 375,1	$ 1 375,1	
7	**G**	2.2.1	Identification of available dataset		3 days	28/5/2025	30/5/2025	Product Lead	Business Analyst	Three-point Estimating	Level of Effort	2,4	3	3,6	3	-0,2000	0,0400		3	1	24	$31,25	$ 750,00						$ 750,0	$ 750,0	
8	**H**	2.2.2	Collect and consolidate relevant food-related data		7 days	2/6/2025	10/6/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Level of Effort	5,6	7	8,4	7	-0,4667	0,2178		7	1	56	$40,63	$ 2 275,28	$500,00	$700,00	$900,00	$ 700,00		$ 2 975,3	$ 2 975,3	
8	**H**	2.2.2	Collect and consolidate relevant food-related data		7 days	2/6/2025	10/6/2025	Product Lead	Nutritionist (Contractor)	Parametric Estimating	Discrete Effort	5,6	7	8,4	7	-0,4667	0,2178		7	1	56		$ -					$ 7 500,0	$ 7 500,0	$ 7 500,0	
9	**I**	2.2.3	Annotate and label food items		10 days	11/6/2025	24/6/2025	Product Lead	Nutritionist (Contractor)	Parametric Estimating	Discrete Effort	8	10	12	10	-0,6667	0,4444		10	1	80		$ -					$ 7 500,0	$ 7 500,0	$ 7 500,0	
10	**J**	2.2.4	Exploratory Data Analysis (EDA)		7 days	25/6/2025	3/7/2025	Project Manager/CTO	Data Analyst	Three-point Estimating	Apportioned Effort	5,6	7	8,4	7	-0,4667	0,2178		7	1	56	$31,25	$ 1 750,00						$ 1 750,0	$ 1 750,0	
11	**K**	2.2.5	Data cleaning: outliers, NA, duplicates, inconsistencies		7 days	4/7/2025	14/7/2025	Project Manager/CTO	Data Analyst	Three-point Estimating	Apportioned Effort	5,6	7	8,4	7	-0,4667	0,2178		7	1	56	$31,25	$ 1 750,00	$550,00	$720,00	$880,00	$ 716,67		$ 2 466,7	$ 2 466,7	
12	**L**	2.2.6	Data transformation: type conversion, scaling and normalization, etc.		5 days	15/7/2025	21/7/2025	Project Manager/CTO	Data Analyst	Three-point Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$31,25	$ 1 250,00	$400,00	$550,00	$650,00	$ 533,33		$ 1 783,3	$ 1 783,3	
13	**M**	2.2.7	Principal Component Analysis for dimensionality reduction		5 days	22/7/2025	28/7/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$40,63	$ 1 625,20	$350,00	$500,00	$650,00	$ 500,00		$ 2 125,2	$ 2 125,2	
14	**N**	2.2.8	Split dataset (training, validation, testing)		3 days	29/7/2025	31/7/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Discrete Effort	2,4	3	3,6	3	-0,2000	0,0400		3	1	24	$40,63	$ 975,12						$ 975,1	$ 975,1	
15	**O**	2.2.9	Measure accuracy and precision		10 days	1/8/2025	14/8/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Discrete Effort	8	10	12	10	-0,6667	0,4444		10	1	80	$40,63	$ 3 250,40						$ 3 250,4	$ 3 250,4	
16	**P**	2.2.10	Generate confusion matrix		3 days	15/8/2025	19/8/2025	Project Manager/CTO	AI/ML Specialist	Three-point Estimating	Apportioned Effort	2,4	3	3,6	3	-0,2000	0,0400		3	0,5	12	$40,63	$ 487,56						$ 487,6	$ 487,6	
17	**Q**	2.2.11	Conduct testing		7 days	20/8/2025	28/8/2025	Project Manager/CTO	QA Engineer	Three-point Estimating	Apportioned Effort	5,6	7	8,4	7	-0,4667	0,2178		7	0,5	28	$31,25	$ 875,00	$600,00	$600,00	$600,00	$ 600,00		$ 1 475,0	$ 1 475,0	
18	**R**	2.2.12	Export the model to integrate with mobile development (TensorFlow Lite)		5 days	29/8/2025	4/9/2025	Project Manager/CTO	Mobile Developer	Three-point Estimating	Apportioned Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$37,50	$ 1 500,00	$100,00	$300,00	$500,00	$ 300,00		$ 1 800,0	$ 1 800,0	
19	**S**	**3,0**	**Development (Adaptative Methodology Agile)**	**Agile**	**225 days**	**5/9/2025**	**16/7/2026**	Project Manager/CTO	**Development Team**																					**$ 462 959,1**	**75%**
			15 Sprints						Product Lead as Product Owner	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,9	1620	$43,75	$70 875,00						$ 70 875,0	$ 70 875,0	
			15 Sprints						Project Manager/CTO (as Scrum Master if needed)	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,8	1440	$56,25	$81 000,00						$ 81 000,0	$ 81 000,0	
			15 Sprints						Backend Developer	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,85	1530	$40,63	$62 163,90						$ 62 163,9	$ 62 163,9	
			15 Sprints						Development Lead	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,25	450	$46,88	$21 096,00						$ 21 096,0	$ 21 096,0	
			15 Sprints						Mobile Developer	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,8	1440	$37,50	$ 54 000,00						$ 54 000,0	$ 54 000,0	
			15 Sprints						QA Engineer	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,9	1620	$31,25	$ 50 625,00						$ 50 625,0	$ 50 625,0	
			15 Sprints						UX/UI Designer	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,8	1440	$34,38	$ 49 507,20						$ 49 507,2	$ 49 507,2	
			15 Sprints						AI/ML Specialist	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,5	900	$40,63	$ 36 567,00						$ 36 567,0	$ 36 567,0	
			15 Sprints						Business Analyst	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,33	594	$31,25	$ 18 562,50						$ 18 562,5	$ 18 562,5	
			15 Sprints						Data Analyst	Three-point Estimating		180	225	270	225	-15,0000	225,0000		225	0,33	594	$31,25	$ 18 562,50						$ 18 562,5	$ 18 562,5	
		4,0	**Marketing and Launch**		**31 days**	**14/7/2026**	**25/8/2026**																							**$ 65 800,0**	**11%**
		4,1	**Launch Campaign**	**Predictive**	**14 days**	**14/7/2026**	**31/7/2026**																							**$ 43 350,0**	
20	T	4.1.1	Align campaign objectives and KPIs		5 days	14/7/2026	20/7/2026	Product Lead	Marketing Agency (Contractor)	Parametric Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5		0		$ -					$ 20 000,0	$ 20 000,0	$ 20 000,0	
20	T	4.1.1	Align campaign objectives and KPIs		5 days	14/7/2026	20/7/2026	Project Manager/CTO	Product Lead	Three-point Estimating	Apportioned Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$43,75	$ 1 750,00						$ 1 750,0	$ 1 750,0	
21	U	4.1.2	Identify target audience and personas		5 days	21/7/2026	27/7/2026	Product Lead	Marketing Agency (Contractor)	Parametric Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5		0		$ -					$ 20 000,0	$ 20 000,0	$ 20 000,0	
22	V	4.1.3	Stakeholder Engagement Review		4 days	28/7/2026	31/7/2026	Project Manager/CTO	Product Lead	Three-point Estimating	Apportioned Effort	3	4	5	4	-0,3333	0,1111		4	1	32	$43,75	$ 1 400,00	$100,00	$ 150,00	$350,00	$ 200,00		$ 1 600,0	$ 1 600,0	
		4,2	**Create promotional material**	**Predictive**	**17 days**	**3/8/2026**	**25/8/2026**																							**$ 22 450,0**	
23	W	4.2.1	Design visual assets		10 days	3/8/2026	14/8/2026	Product Lead	Marketing Agency (Contractor)	Parametric Estimating	Discrete Effort	8	10	12	10	-0,6667	0,4444		10		0		$ -					$ 20 000,0	$ 20 000,0	$ 20 000,0	
24	X	4.2.2	Define copy for materials		7 days	17/8/2026	25/8/2026	Project Manager/CTO	Product Lead	Three-point Estimating	Discrete Effort	6	7	8	7	-0,3333	0,1111		7	1	56	$43,75	$ 2 450,00						$ 2 450,0	$ 2 450,0	

ID	ID	WBS	Task Name	Type of methodology	Duration	Start	Finish	Resp/Acc.	Resources	Type of estimate	Type of Effort	tO	tM	tP	tE	SD	V	ER	Duration	Units	Work	$/h	HR	Oc	Mc	Oc	Materials	Contracts	Direct Cost	Cost	% Total Cost
		0	**AI-based Nutrition Augmented Reality App for Supermarket Chains**		**402 days**	**21/4/2025**	**3/11/2026**																							**$ 615 152,49**	
		5,0	**Documentation and training**		**27 days**	**26/8/2026**	**1/10/2026**																							$ 6 647,1	**1%**
		5,1	**User documentation**	**Predictive**	**15 days**	**26/8/2026**	**15/9/2026**																							**$ 5 217,1**	
25	Y	5.1.1	Create manual for the users		10 days	26/8/2026	8/9/2026	Product Lead	UX/UI Designer	Three-point Estimating	Discrete Effort	8	10	12	10	-0,6667	0,4444		10	1	80	$34,38	$ 2 750,40	$200,00	$250,00	$350,00	$ 266,67		$ 3 017,1	$ 3 017,1	
25	Y	5.1.2	Create manual for the users		10 days	26/8/2026	8/9/2026	Product Lead	Business Analyst	Three-point Estimating	Discrete Effort	8	10	12	10	-0,6667	0,4444		10	0,6	48	$31,25	$ 1 500,00						$ 1 500,0	$ 1 500,0	
26	Z	5.1.3	List frequent asked question		5 days	9/9/2026	15/9/2026	Project Manager/CTO	Product Lead	Three-point Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5	0,4	16	$43,75	$ 700,00						$ 700,0	$ 700,0	
		5,2	**Training**	**Predictive**	**12 days**	**16/9/2026**	**1/10/2026**																							**$ 1 430,0**	
27	AA	5.2.1	User manual		7 days	16/9/2026	24/9/2026	Project Manager/CTO	Product Lead	Three-point Estimating	Discrete Effort	5,6	7	8,4	7	-0,4667	0,2178		7	0,4	22,4	$43,75	$ 980,00						$ 980,0	$ 980,0	
28	AB	5.2.2	Knowledge transfer (KT) sessions		5 days	25/9/2026	1/10/2026		Project Manager/CTO	Three-point Estimating	Level of Effort	4	5	6	5	-0,3333	0,1111		5	0,2	8	$56,25	$ 450,00						$ 450,0	$ 450,0	
		6,0	**Project Closing**		**23 days**	**2/10/2026**	**3/11/2026**																							$ 10 695,0	**2%**
		6,1	**Final review**	**Predictive**	**12 days**	**2/10/2026**	**19/10/2026**																							**$ 2 320,0**	
29	AC	6.1.1	Prepare final project report		5 days	2/10/2026	8/10/2026	Product Lead	Business Analyst	Three-point Estimating	Discrete Effort	4	5	6	5	-0,3333	0,1111		5	1	40	$31,25	$ 1 250,00						$ 1 250,0	$ 1 250,0	
30	AD	6.1.2	Create KPI (Key Performance Indicators) report		4 days	9/10/2026	14/10/2026	Product Lead	Business Analyst	Three-point Estimating	Discrete Effort	3,2	4	4,8	4	-0,2667	0,0711		4	0,8	25,6	$31,25	$ 800,00						$ 800,0	$ 800,0	
31	AE	6.1.3	Conduct lessons learned session		3 days	15/10/2026	19/10/2026		Project Manager/CTO	Three-point Estimating	Level of Effort	2,4	3	3,6	3	-0,2000	0,0400		3	0,2	4,8	$56,25	$ 270,00						$ 270,0	$ 270,0	
		6,2	**Finalize administrative closure**	**Predictive**	**4 days**	**20/10/2026**	**23/10/2026**																							**$ 6 710,0**	
32	AF	6.2.1	Archive all project documentation		4 days	20/10/2026	23/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	3,2	4	4,8	4	-0,2667	0,0711		4	0,4	12,8	$56,25	$ 720,00						$ 720,0	$ 720,0	
33	AG	6.2.2	Review and close vendor contracts		4 days	20/10/2026	23/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Level of Effort	3,2	4	4,8	4	-0,2667	0,0711		4	0,15	4,8	$56,25	$ 270,00						$ 270,0	$ 270,0	
34	AH	6.2.3	Finalize Financial Accounts and Payments		4 days	20/10/2026	23/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	3,2	4	4,8	4	-0,2667	0,0711		4	0,25	8	$56,25	$ 450,00						$ 450,0	$ 450,0	
35	AI	6.2.4	Finalize contract closure documents		3 days	20/10/2026	22/10/2026	CEO	Legal Advisor	Three-point Estimating	Discrete Effort	3,2	4	4,8	4	-0,2667	0,0711		3									$ 5 000,0	$ 5 000,0	$ 5 000,0	
35	AI	6.2.4	Finalize contract closure documents		3 days	20/10/2026	22/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	2,4	3	3,6	3	-0,2000	0,0400		3	0,2	4,8	$56,25	$ 270,00						$ 270,0	$ 270,0	
		6,3	**Formal Project Acceptance**	**Predictive**	**7 days**	**26/10/2026**	**3/11/2026**																							**$ 1 665,0**	
36	AJ	6.3.1	Submit final project report to stakeholders		3 days	26/10/2026	28/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	2,4	3	3,6	3	-0,2000	0,0400		3	1	24	$56,25	$ 1 350,00						$ 1 350,0	$ 1 350,0	
37	AK	6.3.2	Obtain formal sign-off from project sponsor		2 days	29/10/2026	30/10/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	1,5	2	2,5	2	-0,1667	0,0278		2	0,25	4	$56,25	$ 225,00						$ 225,0	$ 225,0	
38	AL	6.3.3	Closure		2 days	2/11/2026	3/11/2026	CEO	Project Manager/CTO	Three-point Estimating	Discrete Effort	1,5	2	2,5	2	-0,1667	0,0278		2	0,1	1,6	$56,25	$ 90,00						$ 90,0	$ 90,0	

Appendix 2. Contract closure deliverable

License for development

Field	Value
Project / Work-Package Title	Development Software Licensing for AR-AI Platform
Contract No. / Ref.	DEV-LIC-2025-01
Contractor	CodeOneSoft (USA)
Contract Type	Fixed-price
Award Value / Currency	USD 1 224,75
Notice to Proceed (NTP)	45811
Planned Finish	45828
Actual Finish	-
Report Date	28 May 2025
Role	Project Manager
Confidentiality	Internal

Deliverable ID / Description
D1: License key activation
D2: User documentation
D3: Support confirmation
D4: Platform compatibility

Supplier Selection

Vendor	Evaluation Criteria	Score	Weight	Notes
CodeOneSoft (USA)	Official Vendor Status	9	10%	Gold Partner
	Price	9	10%	$ 1224,75
	License Scope	9	10%	15 users
	Technical Support	10	15%	24/7 chat and phone
	Compatibility	10	35%	Compatible Android/iOS
	Delivery Time (Activation)	8	10%	5 business days
	Legal Compliance	8	10%	Standard

Contract Performance

Deliverables Acceptance

Deliverable ID / Description	Status	Acceptance Date	Notes
D1: License key activation	Pending	-	Activated within 5 business days.
D2: User documentation	Pending	-	Provided in PDF/online format.

D3: Support confirmation	Pending	-	24/7 support verified.
D4: Platform compatibility	Pending	-	Tested with Android Studio & AR SDKs.
Formal Closure			
Contract Officially Closed:	No		
Final Payment Processed:	No		
Outstanding Issues:	None		

Model Training

Field	**Value**
Project / Work-Package Title	Development Model Training for AR-AI Platform
Contract No. / Ref.	DEV-Model-2025-01
Contractor	AWS SageMaker
Contract Type	Pay-as-you-go
Award Value / Currency	USD 9,000
Notice to Proceed (NTP)	02-Jun-25
Planned Finish	02-Jun-27
Actual Finish	-
Report Date	05 June 2025
Role	Project Manager
Confidentiality	Internal
Deliverable ID / Description	
D1: Platform access credentials.	
D2: Usage dashboard.	
D3: GPU Access Report.	
D4: Dataset storage provisioning.	

Supplier Selection				
Vendor	**Evaluation Criteria**	**Score**	**Weight**	**Notes**
AWS SageMaker	Proven AI platform	10	15%	Offered by Amazon: Leader in AI/ML
	Legal Compliance	8	10%	Security and standard certificates
	GPU and Dataset support	8	20%	Offer p3/p4 GPU, large scale

	Python Compatibility	8	20%	Fully compatibility Jupiter-PyTorch
	Price (Pay-as-you-go)	9	20%	Hourly usage
	Setup	9	15%	Full setup < 1 week

Contract Performance			
Deliverables Acceptance			
Deliverable ID / Description	**Status**	**Acceptance Date**	**Notes**
D1: Platform access credentials.	Pending	-	Access 7/24 in the platform
D2: Usage dashboard.	Pending	-	Hourly dashboard with notification
D3: GPU Access report.	Pending	-	Hourly dashboard with notification
D4: Dataset storage provisioning.	Pending	-	5TB S3 bucket provisioned

Formal Closure	
Contract Officially Closed:	No
Final Payment Processed:	No
Outstanding Issues:	None

Subscriptions

Field	Value
Project / Work-Package Title	Licenses for Manage team for AR-AI Platform
Contract No. / Ref.	DEV-LIC-2025-02
Contractor	Attlasian
Contract Type	Fixed-Price
Award Value / Currency	USD 683
Notice to Proceed (NTP)	07-May-25
Planned Finish	07-May-27
Actual Finish	-
Report Date	07 May 2025
Role	Project Manager
Confidentiality	Internal

Deliverable ID / Description
D1: Subscription activation.
D2: Admin panel access.
D3: Documentation.
D4: Support Access

Supplier Selection				
Vendor	**Evaluation Criteria**	**Score**	**Weight**	**Notes**
Attlasian	Market recognition	10	15%	Over 200.000 companies
	Legal Compliance	7	10%	Security and Standar certificates
	Collaboration tools	10	20%	Around 5 tools for collaboration
	Response times	9	15%	24/7 for premiun
	Price	10	20%	$8 - $14 user month depending on plan
	Activation time	9	10%	Less than 72 hours
	Admin panel	10	10%	Admin console include billing

Contract Performance			
Deliverables Acceptance			
Deliverable ID / Description	**Status**	**Acceptance Date**	**Notes**
D1: Subscription activation.	Pending	-	Attlasian in 48h
D2: Admin panel access.	Pending	-	Full permission granted
D3: Documentation.	Pending	-	Vendor provide documentation
D4: Support Access	Pending	-	Attlasian 24/7 support

Formal Closure	
Contract Officially Closed:	No
Final Payment Processed:	No
Outstanding Issues:	None

Hosting

Field	Value
Project / Work-Package Title	Hosting agreement for AR-AI Platform
Contract No. / Ref.	DEV-Host-2025-01
Contractor	Google Cloud Platform
Contract Type	Pay-as-you-go
Award Value / Currency	USD 300
Notice to Proceed (NTP)	29-Aug-25
Planned Finish	29-Aug-27
Actual Finish	-
Report Date	30 Aug 2025
Role	Project Manager
Confidentiality	Internal

Deliverable ID / Description
D1: License key activation
D2: User documentation
D3: Support confirmation
D4: Platform compatibility

Supplier Selection

Vendor	Evaluation Criteria	Score	Weight	Notes
Google Cloud Platform	Market recognition	9	10%	2nd Largest Company
	Legal Compliance	9	10%	Security and standard certificates
	Scalability, failover, backend deployment	9	20%	Scalable and flexible
	SLA and Support	9	15%	24/7 Support with SLA
	Price	10	15%	Hourly price, pya-as-you-go
	Activation time	10	10%	Immediate
	Admin panel	9	20%	GCP Console + CLI

Contract Performance

Deliverables Acceptance

Deliverable ID / Description	Status	Acceptance Date	Notes
D1: License key activation	Pending	-	Immediate
D2: User documentation	Pending	-	Provide when activation is completed
D3: Support confirmation	Pending	-	Vendor will provide documentation
D4: Platform compatibility	Pending	-	Tested

Formal Closure

Contract Officially Closed:	No
Final Payment Processed:	No
Outstanding Issues:	None

Server Configuration

Field	Value

Project / Work-Package Title	Server Configuration for AR-AI Platform
Contract No. / Ref.	DEV-Host-2025-01
Contractor	ServerCOnf
Contract Type	Pay-as-you-go
Award Value / Currency	USD 1308
Notice to Proceed (NTP)	02-Jun-25
Planned Finish	02-Jun-26
Actual Finish	-
Report Date	05 June 2025
Role	Project Manager
Confidentiality	Internal
Deliverable ID / Description	
D1: Server and environment setup.	
D2: Deployment Configuration.	
D3: Documentation.	

Supplier Selection

Vendor	Evaluation Criteria	Score	Weight	Notes
ServerCOnf	Experience	10	10%	7 year experience
	Cloud Skills	9	15%	AWS Certified and ISO27001
	Configuration Scope	9	25%	Load testing, git, deployment
	Security	9	25%	SSL/TSL, firewall rules, audit
	Price	10	25%	$3800 flat rate

Contract Performance

Deliverables Acceptance

Deliverable ID / Description	Status	Acceptance Date	Notes
D1: Server and environment setup.	Pending	-	Waiting for requirements
D2: Deployment Configuration.	Pending	-	Provide when activation is completed
D3: Documentation.	Pending	-	Vendor will provide documentation

Formal Closure	
Contract Officially Closed:	No
Final Payment Processed:	No
Outstanding Issues:	None

Launch campaign and Promotional Materials

Field	Value
Project / Work-Package Title	Market research for AR-AI Platform
Contract No. / Ref.	DEV-MK-2025-01
Contractor	Eleven Studios
Contract Type	Fixed-Price
Award Value / Currency	USD 60 000
Notice to Proceed (NTP)	14-July-26
Planned Finish	28-Aug-26
Actual Finish	-
Report Date	15 July 2025
Role	Project Manager
Confidentiality	Internal
Deliverable ID / Description	
D1 – Flyers (English and Spanish).	
D2 – Banners (English and Spanish).	

Supplier Selection				
Vendor	**Evaluation Criteria**	**Score**	**Weight**	**Notes**
Eleven Studios	Logistic and distribution	10	30%	3 regional hubs with nationwide coverage
	Lead time	10	30%	Guarantees between 2 to 6 days
	Cost	9	20%	62500
	Sustainability	10	10%	70% recyclable, partial use soy-based ink
	Design and Innovation	10	10%	Modern and standard design

Contract Performance			
Deliverables Acceptance			
Deliverable ID / Description	**Status**	**Acceptance Date**	**Notes**
D1 – Flyers (English and Spanish).	Pending	-	Review and approval by FoodMart's Marketing Manager and Brand Compliance Officer
D2 – Banners (English and Spanish).	Pending	-	Review and approval by Marketing Lead and Store Operations Team
Formal Closure			
Contract Officially Closed:	No		
Final Payment Processed:	No		
Outstanding Issues:	None		

Nutrition

Field	Value
Project / Work-Package Title	Nutrition for AR-AI Platform
Contract No. / Ref.	DEV-Host-2025-01
Contractor	Nutrifit
Contract Type	Fixed-Price
Award Value / Currency	USD 15,000
Notice to Proceed (NTP)	02-Jun-25
Planned Finish	02-Sept-25
Actual Finish	-
Report Date	05 June 2025
Role	Project Manager
Confidentiality	Internal
Deliverable ID / Description	
D1: Nutritional database & recommendations.	
D2: Recipes database.	
Supplier Selection	

Vendor	Evaluation Criteria	Score	Weight	Notes
Nutrifit	Experience	100	10%	8 year experience
	Credentials	100	10%	2 year warranty + vendor warranty
	Number of project	100	5%	Dell Laptops include peripherals.
	Client references	75	5%	Android and iOS latest generation
	Ratings	50	5%	5 - 7 days
	Price	100	25%	$14,000
	Service guarantees	100	10%	
	Currency	75	20%	
	Payment terms	100	5%	
	Geographical Location	75	5%	

Contract Performance			
Deliverables Acceptance			
Deliverable ID / Description	**Status**	**Acceptance Date**	**Notes**
D1: Nutritional database & recommendations.	Pending	-	Data validation pending from nutrition team
D2: Recipes database.	Pending	-	-

Formal Closure	
Contract Officially Closed:	No
Final Payment Processed:	No
Outstanding Issues:	None